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Isabelle Draelants

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Boston Studies in the Philosophy and History of Science 333

Florence Bretelle-Establet
Marie Gaille
Mehrnaz Katouzian-Safadi *Editors*

Making Sense of Health, Disease, and the Environment in Cross-Cultural History: The Arabic-Islamic World, China, Europe, and North America

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Volume 333

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"Dry, open situations meanly elevated, […] are above all others the healthiest; for such habitations have a free, pure, open air […] Low habitations, especially on stiff clay, rotten earth, or near a level with the sea, great rivers, marshes, lakes or putrid standing waters. These are worst of all; for their air is always moist, gross, and loaded with exhalations often putrid". Short, 1750

"In fact, winds are the main agents of all diseases Φαίνονται οὖν αἱ φῦσαι διὰ πάντων τῶν νοσημάτων μάλιστα πολυπραγμονοῦσαι ". Hippocrates, 5th BCE

"The wind is the origin of the one hundred diseases 故風者百病之始也".
Huangdi neijing 黃帝內經, 3th BCE-2th CE

"The harmful species are as important as the useful species… Their harmful side is of capital importance, for all these beings are complementary and indispensable to ensure general interest and global welfare

"فسبحان من جعل منافعها نعمة، ومضارها ترجع إلى أعظم المنافع ... وجعل في الجميع تمام المصلحة، وباجتماعهما تتم النعمة، وفي بطلان واحد منها بطلان الجميع، إنما هو واحد ضم إلى واحد وواحد ضم إليهما." الجاحظ Ǧāḥiẓ, 9th

"The physician's treatment should be adapted to the bodies in Egypt […]. The harmful effect of such drugs can be rapid in the body, especially in Egyptians, whose bodies are quick to suffer from injury. He should select from purgative drugs and others the gentlest in strength, so that there is no discomfort or harm to the bodies of Egyptians. He should not prescribe drugs found in the medical books of Greeks and Persians, for most of them are aimed at bodies with strong constitutions and with strong coarse humors

"وجب على الطبيب ان يختار من الأغذية ومن الأدوية [...]ما كان من الأدوية المسهلة وغيرها ألين قوة حتى لا تكون على طبيعة المصريين فيها كلفة ولا يلحق أبدانهم منها مضرة. ولا يقدم على الأدوية الموجودة فى كتب الأطبا اليونانيين و الفرس فإن أكثرها عملت الأبدان قوية البنية غليظة الأخلاط." ابن رضوان Ibn Riḍwān, 11th

"In the wild mountain forests, a humid Qi accumulates. Near the sea, it is even worse and this Qi causes diseases. […] Also there can be a putrid Qi coming from rotten herbs and plants. We call it the toxic mountain miasma .山林曠野常有濕氣集乎其間。而瀕海尤甚其氣病人[…]或腐草污木淤泥之臭氣。名為山嵐瘴毒". Chen Zhen'ge陳珍閣, 1892

"La Nature a fait tous les êtres les uns pour les autres, et n'a point voulu qu'aucun d'eux fût isolé ou inutile". Moreau, 1798

"The invisible shapes of smells, rhythms of cricketsong, and the movement of shadows all, in a sense, provide the subtle body of our thoughts. Our own reflections, we might say, are a part of the play of light and its reflections. 'The inner—what is it, if not intensified sky?'". Abram, 1996

" I corpi di pori assai apperti sono piu facili ad infettarsi ". Soldi, 1431

"People from Yue, their pores are often open, their skin and flesh are not closed, this is because of an excessive sudation which lets evil from the outside (enter)粵人疏理元府常開毛腠不掩每因汗溢即致外邪". Qu Dajun屈大均, 1678

"Both dangers and benefits arise from our food". Mollison, 1988

"There are good scientific and historical reasons for regarding the state of our soils as the best measure of the future health and well-being of society". Holmgren, 2011

"in the North, [..] (People's) constitution is robust, and people eat and drink with moderation. At home they are thrifty and plain and it is very rare that they contract a disease that injuries their original Qi. If they have a disease, one must use bitter and cold remedies to course and disinhibit. The disease disappears and immediately people feel comfortable. Conversely, Southeastern people's constitution is delicate, their pores are not closed, they take too much food and drink, and have too much sex, they are very different from Northwestern people, if you give them bitter and cold remedies to purge them, wouldn't it be the same as killing them with a blade?. 蓋北方[...]，稟賦雄壯，兼之飲食倍常。居室儉素，殊少強賊元氣之患。一有疾病，輒以苦寒疏利之。若夫東南之人，體質柔脆而飲食色欲之過侈，與西北之人迥異，概以苦寒之劑攻之目不幾有操刃而殺人乎 ". Yu Bian 俞弁, 16th

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Acknowledgments

This volume is one of the results of a collaborative project that started in 2012 between a small group of historians and philosophers—belonging to the SPHERE research team—working on the history of science and medicine in the Arabic-Islamic world, in China, in Europe, and in Latin America. This project began as a collective reflection on the issue of the relationships between health, disease, and the environment in a SPHERE seminar—*Environment, Disease, Therapy*. The financial support provided by SPHERE allowed us to organize a workshop in 2015, *Environment and Health between Observation, Imagination and Theories in Different Parts of the World*. This workshop provided the opportunity to transform our initial questions into a more elaborated reflection and to enlarge the context in which the relationships between health, disease, and the environment should be approached, as researchers from various parts of the world, notably from Morocco, China, and Tunisia, made presentations in this workshop. It also allowed us to determine the organization and the content of this book.

This volume owes its success to different people to whom we would like to express our gratitude. Our thanks first go to all the contributors of this volume, for their research, their cheerful input into this collective book, and their patience. This book includes many authors who are not English native speakers and needed to have their contribution translated or edited. Our thanks thus also go to Richard Kennedy for his careful translation or editing of the various contributions and to several institutions, namely, l'Institut Confucius Diderot, l'Institut Humanités, Sciences et Sociétés (IHSS), and SPHERE (Université de Paris, UMR 7219, CNRS & Université de Paris), for their financial support for this work.

Writing in a language which is not your mother tongue always carries something like an accent, which in spite of efforts to erase it, is like the local soil that sticks to your shoes, to paraphrase the poet Miguel Zamacoïs (1866–1955, "L'accent"). Each time you speak, your words while addressing something else, still speak of your region. "L'accent ? c'est un peu le pays qui vous suit… Avoir l'accent, enfin, c'est

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chaque fois qu'on cause, parler de son pays en parlant d'autre chose !". Let's hope that the contributors of this book, speaking from and about various geographical regions, will be understood and will also echo the cultural and linguistic diversity essential to this cross-cultural book. Book of this sort, written in a second language requires the combined effort of those who write and those who read… so, we would also like to offer our thanks to all our readers!

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Chapter 2
Creation, Generation, Force, Motion and Habit: Medieval Theoretical Definitions of Nature

Isabelle Draelants, with the collaboration of Eduard Frunzeanu

Abstract In order to illustrate the theoretical definitions of nature commonly shared in the mid-thirteenth century in Europe, we translate and comment on the definition of nature given in the "Mirror of Sciences" (*Speculum doctrinale* XV, ch. 4) compiled by a Dominican friar, Vincent of Beauvais. While complex, this European fourfold definition reflects to a degree all the theoretical conceptions of nature used at this time, including the literary heritage available, some theological definitions and the new inputs from natural philosophy (Arabo- and Greco-Latin translations). It synthetizes the conceptions of nature, some of which go back to Augustine of Hippo (fifth century), to William of Conches (twelfth century), to Aristotle and to the medical school of Salerno until the beginning of the thirteenth century.

Keywords Nature · Creation · Generation · Corruptibility · Middle Ages · Encyclopedias · Philosophy · Scholastics · Augustine of Hippo · Hugh of Saint-Victor · William of Conches · Albertus Magnus · Vincent of Beauvais · Vermin

For medieval man, *natura* was a multifaceted, universal and all-encompassing concept that covered the heavenly, terrestrial, divine and human environment from the creation of the world to the end of time. The long medieval millennium, however, presented various conceptions of nature, according to the time, the place and the social, economic and intellectual conditions and the type of historical, archaeological or literary traces bearing witness to it. This requires those interested in medieval

Some of the material presented here is discussed in Eduard Frunzeanu's doctoral thesis, University of Montréal (Frunzeanu 2007).

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nature to choose a point of view. If one keeps to the scholarly texts, it is possible to isolate, for example, for the thirteenth century, some philosophical definitions. In Europe, this was the era of the birth of universities, a period called "scholastic" because of the importance taken by teaching in "schools"; it is also the time when the natural law emerged. We have chosen to present a few rich definitions of nature drawn from encyclopaedias and dictionaries from the North of France and Germany. Taking this hub as the starting point has the advantage of giving us access retrospectively to the broad scholarly culture of the medieval West through compilations that amass, bring together and order a large number of ancient and medieval works and authors.

At the same time, the philosophical character, in the broad sense, of the texts proposed here does not make it possible to illustrate the material, economic or poetic medieval conception of nature or man's everyday environment in the Middle Ages, to which a first part of this chapter is devoted, presenting an outline of the cultural context. The second part consists in the translation and analysis of the content of the definitions of nature taken from an encyclopaedia from the middle of the thirteenth century intended for the intellectual training of Dominican monks. In order to do so, we analyse the complex network of textual, theological and philosophical sources of inspiration that informed these definitions. In the third part, two other definitions drawn from medieval dictionaries, present the various meanings of the word "nature" that were current around 1200 and the end of the thirteenth century. Nevertheless, all these sources, together with their different origins and ages, adopted, as it was always the case in the Middle Ages a very respectful attitude toward the authority of the written word and a broad intertextuality. Finally, as a counterpoint, come into discussion some of the spaces that are "out-of-nature", supernatural or beyond the reach of human understanding.

2.1 Cultural Context of the Eleventh and Twelfth Centuries

In the Middle Ages, when the population of our planet is estimated to have been between two and four hundred million, the influence of human activity on nature was considerably less than it is today. In the Western Christianity built on the ruins of the Roman Empire, whose monasticism was the new and foremost cultural, social and economic network, man was not perceived as a threat to his earthly environment. The biblical prescription "go forth and multiply" was, on the contrary, an encouragement for humanity on earth to continue the work of the sixth day of Creation, that is to say, to order, name and take dominion over nature:

> Then God said, "Let us make man in our image, after our likeness. And let them have dominion over the fish of the sea and over the birds of the heavens and over the livestock and over all the earth and over every creeping thing that creeps on the earth."
>
> So God created man in his own image, in the image of God he created him; male and female he created them.
>
> And God blessed them. And God said to them, "Be fruitful and multiply and fill the earth and subdue it, and have dominion over the fish of the sea and over the birds of the

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> heavens and over every living thing that moves on the earth." And God said, "Behold, I have given you every plant yielding seed that is on the face of all the earth, and every tree with seed in its fruit. You shall have them for food. And to every beast of the earth and to every bird of the heavens and to everything that creeps on the earth, everything that has the breath of life, I have given every green plant for food." And it was so. (Genesis 1:26–30: English Standard Version)

The hereafter was perceived as temporally and spatially infinite, and the limited sublunary universe was seen as the pale, earthly reflection of divine ideas. As such, it fell into a linear timescale whose end would be marked by the last judgement, and was placed in a post-historical space. In this perspective, the rare meteorological and political records transcribed in the annals of the abbeys in the early Middle Ages show that, on a daily basis, dramatic terrestrial events such as natural disasters, excessive weather, earthquakes, volcanic eruptions and eclipses were linked to famines,[1] were often perceived as divine punishments in response to man's sins. Similarly, the wonders observed in the world were seen as signs, visible symbols of the divine majesty which needed to be interpreted unceasingly in order to attain the invisible reality of the hereafter.[2] The Apostle Paul's adage (Romans I, 20), relayed by Augustine (354–430), the Father of the Church, was in this respect a powerful speculative stimulus for the symbolic exegesis of nature in Biblical commentaries and sermons: "For his invisible attributes, namely, his eternal power and divine nature, have been clearly perceived, ever since the creation of the world, in the things that have been made".[3]

Historians have time and again observed that from the twelfth century onwards, a growing interest in the natural world of the "earth below" changed the view: Western man was more inclined to set his eyes on what surrounded him rather than towards the redeeming afterlife; he was interested in the *ornatus,* the stage of Creation concerned with the peopling and "ornament" of the terrestrial world. This period of favourable climate, relatively stable politics and economic prosperity due to better yields distanced itself it from the "dark" centuries of the Middle Ages, so-called because of the precariousness of the institutions and the frequent wars and food shortages. Cities were founded or grew, and urban schools thrived in the West, taking over the function of cultural stockpiling that the abbeys had exercised thus far. In education, the development of logic and the demand for rationality grew, and a new function emerged in society, namely that of *thinking* pertaining to those whom Jacques Le Goff called "intellectuals" or Jacques Verger more recently "men of learning".[4] At the same time, a new conception now presented nature[5] as the vicar of God, the agent of the physical continuation of the Creation from day to day.

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[1] See Draelants 1995 and Draelants 1996.

[2] The Augustinian conception of nature was extremely influential in this respect. See Thonnard 1965.

[3] Saint Paul, *Epistle to the Romans*, I.20: *Invisibilia Dei a creatura mundi, per ea quae facta sunt, intellecta conspiciuntur*. On the exegetical current and its meaning in connection with the perception of nature, see Chenu 1957.

[4] Le Goff 1957, a landmark work, often reprinted. For the end of the Middle Ages, see Verger 1997.

[5] As shown by Tullio Gregory (Gregory 1975).

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Intellectual curiosity – today we would say the scientific viewpoint – hitherto vilified by theologians in favour of contemplation was better received if not approved.[6] This perspective of nature encouraged, and this time also outside the monasteries, the development of a scholarly medicine, which applied to the body and its disorders and little by little, the development of the "natural sciences" *scientia* or *philosophia naturalis*, concerned with man and his meteorological, or more broadly with his cosmological environment, matter, and animate and animate bodies such as stones, plants, animals, and in motion.[7]

While the discourse on Creation had hitherto been dominated by exegesis on the *Hexaemeron* (Genesis), this perspective of nature would now allow the reception and commentary of "philosophical" texts – by this we mean all the non-religious texts intended for study – and, in the twelfth century, encouraged the reputation of schools, such as Salerno for medicine, Chartres for cosmology and Saint-Victor for theology. While it welcomed philosophical texts, another intellectual feature of the twelfth century was represented by various translation movements from Greek and Arabic into Latin, which made scientific works from Antiquity and the Arabic-speaking East available in Europe for the first time. In the following century, the foundation of colleges by religious orders (*studia*) and universities was one of the most evident testimonies of the exploitation of this new intellectual subject.

For a century and a half, many works were translated from Arabic and Greek into Latin: at the end of the eleventh century in Southern Italy for Arabic medicine, thanks to Constantine the African at the Abbey of Monte Cassino, in the twelfth century in the Iberian peninsula (Barcelona and Toledo, among others) and in the Latin states of the Near East (e.g. Antioch) for natural philosophy, medicine, astronomy, astrology and magic and then in the first half of the thirteenth century in Sicily, in the north of France, in Brabant and in the south of England for Greek philosophy.[8] All of these texts, issued from of a very long intellectual tradition which combined successive civilizations from the eastern Hellenistic, Roman, Byzantine and later an Arabized world where they were translated or created – particularly in the

[6] Until quite recently, following Chenu 1957 and Gregory 1975, we tended to consider that the Platonic vision, supported by Augustine's influence, dominated the early Middle Ages. Recently, the perception of nature in the early Middle Ages has been re-evaluated from the point of view of astronomical and cosmological representations, as highlighted by Obrist 2004, 11–13 (and see article note in this chapter).

[7] See Speer 1995 for the new investigation of nature by Adelard of Bath, Bernard of Chartres, William of Conches and Thierry of Chartres in the twelfth century.

[8] The literature on medieval translations is vast and growing rapidly, after the fundamental and pioneering work of M. Steinschneider at the end of the nineteenth century, as well as Grabmann 1916 and Grabmann 1928. On the subject of Arabic-Latin translations, see the works of Charles Burnett, who continued the work of Marie-Thérèse d'Alverny. E.g. Burnett 2009 and the following collected studies: d'Alverny 1994, 1998. Mention should also be made of Lindberg 1978 and the catalogue of Cranz and Kristeller 1960–1980, as well as Van Riet 1987; Jayyusi and Marin 1992; Jolivet 1995; González 1997; Kischlat 2000; Gutas 2005. Among the conferences, *Oriente e Occidente nel Medioevo: Filosofia e Scienze* 1971; Scarcia Amoretti 1987; Endress hrsg. 1989; Hamesse and Fattori 1990; Butterworth 1994; Draelants et al. 2000; Lau and Cobet 2000; Speer and Wegener 2006; Jenkins 2007; Goyens et al. 2008; Lejbowicz and Bourin 2009; Tischler and

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Abbasid period in the eighth and ninth centuries – became, in the thirteenth century, the base of teaching in the nascent Western universities.

These "philosophical" texts, which circulated widely from the thirteenth century onwards, were based on various anthropological and cosmological conceptions. However, this diversity often went unnoticed by the medieval "men of learning", so that Hippocrates, Aristotle, Galen and Avicenna were evoked on the same realities, without necessarily distinguishing their respective modes of thinking about the world.

The growing desire to explain everything resulted in notions linked to Greek and Arabic physics such as matter and form, generation, force, motion and properties gradually emerged from this set of treatises and became, in the thirteenth century, the fundamental physical notions in the study and explanation of the created world. With the influence of Aristotelianism, the search for causes became a criterion of scientificity applied even in theology: one sought to understand both the principles of the generation of natural bodies and the possibility of demonic generation; one studied the motion of entities endowed with bodies as well as those which lacked them, questioned the various levels of the soul which *animate* plants, animals, human and angelic bodies; one asked questions on the nature of motion in the sublunar sphere as in the supralunar world. The identity or "nature" of bodies was related to their "specific force" and to the sensitive or occult properties attached to them; these properties are listed in collections that combine the multiple legacies of ancient and medieval, Greek, Latin and Arabic cultures.

The habituation to certain diets or climatic conditions, the influence of the stars and divine intervention were considered as forces capable of modifying the state of bodies. During the thirteenth century, the notion of *medium* (milieu) gained a growing position in the explanation of phenomena – particularly optical phenomena – but it was only after the Black Death (1317–1348) that the environment and contagion began to be seen as a vector in the transmission or aggravation of diseases.[9]

2.2 Some Definitions of Nature in Encyclopaedias on the Nature of Things

The accumulation of new knowledge caused the desire to structure, order and make it easily accessible, which is why, from the end of the twelfth century, an abundance of new intellectual tools appeared, intended to master these multiple types of knowl-

Fidora 2011; *Entre Orient et Occident: la philosophie et la science gréco-romaines dans le monde arabe* 2011; Köpf and Bauer 2011; Van Oppenraay and Fontaine 2012; Wisnovsky et al. 2012; Federici Vescovini and Hasnawi 2013; De Leemans 2014.

[9] There has recently been renewed interest in studies on the Black Death and epidemics. Before the Black Death, see García-Ballester et al. 1994; for changes in attitude following major epidemics, Green 2015 and Paravicini Bagliani and Santi 1998; Aberth 2010, 2013, esp. 49, 69–70; Herlihy 1980. For a specific medical example, Gottschall 2006.

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edge: the generalization of alphabetical order, the frequent elaboration of tables of contents, indexes and glossaries and also collections of "distinctions" offering definitions and correspondences between works and authors concerning the same key word and a profusion of florilegia and other anthologies which in a way provided "portable libraries".[10] This was also the case for encyclopaedias, which aimed to embracing and organizing global knowledge of all areas. Among these summae we see, in particular between 1200 and 1260, the appearance of encyclopaedias devoted to nature, whose authors applied the recently enriched corpus of ancient and modern philosophical works recently translated and disputed in the schools. They were initially conceived to educate monks, especially in the new itinerant Dominican and Franciscan religious orders,[11] and in particular to provide material for preachers, that is to say, those whose task was to disseminate knowledge through sermons. By applying a method which proved its worth in the reading of holy texts, scholars interpreted these natural realities by means of the same exegetical process that returns the gaze towards heaven through comparisons, correspondences and metaphors.

Most encyclopaedias were made by compilation of various quotations and explanatory glosses called "authorities" (*auctoritates*)[12]; these quotations function like so many reclaimed bricks, laid together in a new edifice of erudition thanks to the encyclopaedist's words and organization; this was the author's main and indispensable intervention. Another more medieval image used for depicting his intervention is that of the florilegist who gathers "flowers" in a garden and brings them together in new bouquets. In the same vein, one can mention the *De naturis rerum* by Alexander Neckam (*ca.* 1200), *De floribus rerum naturalium* by Arnold of Saxe (*ca.* 1230–1240), the *De natura rerum* by Thomas of Cantimpré (*ca.* 1225–1250), the *De proprietatibus rerum* by Bartholomew the Englishman (*ca.* 1230–1247) and the very extensive *Speculum naturale* by Vincent of Beauvais (*ca.*1243–1259). All these works, combining tradition and novelty, had several recensions, indicating a constant interest in updating knowledge on nature, and all had also become in turn, before the end of the thirteenth century, a reservoir of subjects and the templates for new cathedrals of encyclopaedic knowledge, continously rewritten in a cumulative process until at least the sixteenth century.[13]

In this historical context of cultural transition, of widening of knowledge and of emergence of medieval scientific discourse on nature, some definitions of nature gained momentum in the twelfth and especially in the thirteenth century. These definitions refer in a way to all valid theoretical concepts of nature at the time, taking

[10] On this subject, see Rouse 1976, 1981.

[11] Paulmier-Foucart and Duchenne 2004, 11: "la plus grande encyclopédie médiévale, le Speculum maius ou 'Grand miroir' est destinée aux *fratres communes* – soit neuf frères sur dix – qui ne sont pas destinés à poursuivre un enseignement au-delà de celui dispensé au studium de leur couvent".

[12] See the papers collected by Zimmermann 2001.

[13] For an overview on the medieval encyclopaedic genre and bibliographical information: Draelants 2013, 2015.

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into account the various textual and conceptual inheritances available in Christian theology and natural philosophy and transmitting the new contributions of recent Arabic-Latin and Greco-Latin translations. They synthesize different conceptions of nature, some of which go back to the philosopher Aristotle (fifth c. BC), others to the Father of the Church Augustine of Hippo (354–430), others to the Chartrain theologian William of Conches (*ca.* 1080-*ca.* 1150/4) and finally to the Salernitan medicine, which still prevailed at the beginning of the thirteenth century.

The majority of the definitions considered are derived from the encyclopaedic work by Vincent of Beauvais, a friar, preacher and Dominican scholar. He was close to Louis IX, king of France, and taught at the Cistercian royal abbey at Royaumont in the years 1244–1264. He wrote a vast Latin encyclopaedia called *The Great Mirror* (totalling about four million words).[14] The second, more extensive version of this encyclopaedia, written *ca.* 1245–1255, with the help of a team of Dominican friars sent to collect quotations from the various monastic libraries, was developed in three parts. The first contains the story of the Creation and therefore of nature under the name of *Speculum naturale* or the *Mirror of Nature*, and the second the history of man and literature (including hagiography) under the name of *Speculum historiale*, the *Mirror of History*. Before introducing the third part, which contains the definitions that will be examined here, let us emphasize that Vincent of Beauvais drew a distinction between *historia naturalis*, "natural history", and *series temporum*, "the unfolding of events in time", in order to name the two parts of his encyclopaedic enterprise, one dedicated to nature and the other to the history of human time. The word *historia* in the wording "natural history", is a Greek word that means "inquiry" and refers rather to the idea of collecting testimonies, in an intention that reflects *Natural History*, the great model written by Pliny the Elder in the first century. As for the third part of Vincent's encyclopaedia, it was devoted to "doctrine", that is to say, to what one had to learn regarding sciences (*Speculum doctrinale*). At the end of this part in 15 books devoted to all the sciences, their subjects and their classification, we find the first complex definition which we will study; the author himself says it, calling himself *actor*, in a chapter entitled "in how many ways one speaks of *nature*", *Quot modis dicitur natura*. We shall then see that the central preoccupation of defining nature also appears in the *Speculum naturale* and in the *Speculum historiale*.

In the table below, the text is organized in such a way as to highlight the structure of the definition, made up of two main parts, the second again subdivided into four sub-definitions: *primo*, we find a double definition (*dupliciter*), and then another (*aliter*), and that one is itself subdivided (*multipliciter*). The key words appear in bold, and small capitals are used for the sources, that is to say, the textual authorities to which Vincent of Beauvais makes constant reference.

It is important to emphasize that in the medieval era, compilation was an honourable activity, practiced by all scholars in reference to the Ancients; in a way this fits into a medieval way of making bibliographies, of collecting literature, and had more

[14] For an accessible synthesis on the contribution of this author and his work, cf. Paulmier-Foucart 2004.

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value than the word of the author himself. However, not all author-compilers felt constrained to cite their sources systematically and at the same time, the sources do not generally appear under the same titles and authors' names as today. But above all, the authorities mentioned there have sometimes passed via one or more intermediaries; giving the name of an author did not mean that his text was read by the compiler, who may instead have read it via excerpts in florilegia or reported quotations[15]:

Doc. I: *Speculum doctrinale*, XV, Chap. 4, *Quot modis dicitur natura*[16] (Ed. Douai 1624: *Vincentii Burgundi Speculum quadruplex* […], vol. 2, col. 1372–73)

ACTOR. *In summa vero nota, quod natura primo dicitur dupliciter.*	ACTOR. In short, take note that we say "nature" with a double meaning.
I. *Uno modo* ***natura naturans***, id est *ipsa summa lex nature, que deus est; de qua dicit* AUGUSTINUS: *Contra summam illam nature legem a notitia remotam, sive infirmorum, sive impiorum, tam deus nullo modo facit, quam nec contra seipsum facit.*	I. In one sense, by this is meant "nature naturing" [**nature that begets nature**] (*natura naturans*), that is to say, the supreme law of nature, which is God. In this respect, AUGUSTINE says: "God does not act in any way against the supreme law of nature, which is foreign to weak and ungodly minds, just as he does not act against himself".
II. *Aliter vero dicitur* ***natura naturata,*** *et hec multipliciter.*	II. In another sense, we speak of "nature natured" [**begotten** nature] (*natura naturata*) and this in many ways.
II. 1. *Uno modo natura dicitur* ***vis insita*** *rebus, ex similibus similia procreans, ut ex grano granum eiusdem speciei.*	II.1. In the first place, nature is called the **force** which, **intrinsic** to things, procreates similar beings from the beings that are like them, as a seed germinates a seed of the same species.
II.2. *Alio modo dicitur natura* ***principium motus*** *et* ***quietis****, ut superius dictum est.*	II.2. Elsewhere, we call nature the **principle** of **motion** and **rest**, as has been said above.
II.3. *Tertio modo,* ***communis*** *vel usitatus nature* ***cursus*** *mortalibus notus, secundum quod dicuntur* ***miracula*** *fieri* ***contra naturam****: unde et dicit* APOSTOLUS AD ROMANOS: *Tu autem* cum *oleaster esses, contra naturam insertus es in olivam bonam.*	II.3. In a third sense, it is the usual or **accustomed course** of nature known to mortals, in relation to which **miracles** are said to occur **against nature**. Whence THE APOSTLE [IN THE LETTER] TO THE ROMANS says: "if you were cut out of an olive tree that is wild by nature, and contrary to nature were grafted into a good olive tree".
II.4. *Item quarto modo dicitur natura* ***possibilitas*** *creature, quam indidit ei natura naturans,* id est ***deus****, ut ex ea fiat quod ipse vult. Et* sic *accipitur* ibidem IN GLOSA cum *dicitur: id nature est cuique rei, quod de illa fecerit deus.*	II.4. According to a fourth sense, nature is called the **capacity** which nature naturing, namely God, has conferred on the creature to bring about what He wants from it. And this very meaning is in the GLOSS, where it is said that "the nature of everything is what God has made of it".

[15] Cf. Zimmermann 2001.

[16] Translations of the Latin excerpts in this article, when not borrowed from existing publications (indicated), owe much to Eduard Frunzeanu and Monique Paulmier-Foucart (I am also grateful to Patricia Stirnemann for the revision of the English version). For each Latin extract, I have added punctuation, made typographic enhancements and presented the text in subdivisions to facilitate understanding.

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It should be noted that the juxtaposition of the various patristic and philosophical sources assembled by Vincent of Beauvais leads to multiple meanings of the term *natura*. Most of these are not modern but inspired by the Christian tradition, and nearly half of them, in particular item II.3 with the quotation on the graft on the olive tree and the end of II.4, are inspired by the treatise *Contra Faustum* written at the beginning of the fifth century by the most influential of the Fathers of the Church, Augustine of Hippo. Apparently, Vincent of Beauvais found an extract of the *Contra Faustum* in a gloss accompanying a biblical text, without knowing that this exegetical note was taken from Augustine.[17] The whole passage affirms the theocentric character of created natures, since the nature of each thing is "what God will have made of it" with an idea of the future which is, in Vincent of Beauvais' adaptation, brought to mind by the term *possibilitas*, potentiality, capacity. The *Contra Faustum* is concerned here with the design of creation by divine will, with the natural course of nature and with miracles: "God, the Author and Creator of all natures, does nothing contrary to nature; for whatever is done by Him who appoints all natural order and measure and proportion must be natural in every case".[18]

In a way that is more modern and foreign to the patristic tradition, the beginning of the definition, as well as the beginning of item II.4, uses syntagms derived from natural philosophy quite close to the time of Vincent of Beauvais: the expressions

[17] Note that Thomas Aquinas, in the *Summa theologiae* I, qu. 105, Art. 6, (reply to objection 1), quotes more fully and comments on the passage of Augustine's *Contra Faustum* (XXVI): *Unde Augustinus dicit, XXVI contra Faustum, quod* id est *cuique rei naturale, quod ille fecerit a quo est omnis modus, numerus et ordo naturae.* ("Wherefore Augustine says (*Contra Faustum* xxvi, 3): 'That is natural to each thing which is caused by Him from Whom is all mode, number, and order in nature.'" [The *Summa Theologiae*, Online 2016]).

[18] Items I and II.3. are inspired by Augustine's *Contra Faustum* XXVI.3 in the chapter concerning what is "unnatural" or "against the truth" (On this excerpt, see recently Müller 2012, 136–8), as shown by what is emphasized in the following quotation, drawn from chap. *Numquam omnipotens Deus aliquid contrarium naturae sive veritati facit. (…)* "Whether the almighty God does something contrary to nature or to truth": (…) People in error, as you are, are unfit to decide what is **natural** (*secundum naturam*) and what contrary to **nature** (*contra naturam*). We admit that what is contrary to the ordinary course of human experience is commonly spoken of as contrary to nature. Thus the apostle uses the words, "If you are cut out of the wild olive, and engrafted contrary to nature in the good olive". Romans 11:24 Contrary to nature is here used in the sense of **contrary to human experience of the course of nature** (*contra consuetudinem naturae*) (…). But God, the Author and Creator of all natures, does nothing contrary to nature, for whatever is done by Him who appoints all natural order and measure and proportion must be natural in every case. And man himself acts contrary to nature only when he sins; and then by punishment he is brought back to nature again (*redigitur ad naturam*). The natural order of justice requires either that sin should not be committed or that it should not go unpunished. In either case, the natural order is preserved, if not by the soul, at least by God. For sin pains the conscience and brings grief on the mind of the sinner, by the loss of the light of justice, even should no physical sufferings follow, which are inflicted for correction, or are reserved for the incorrigible. There is, however, no impropriety in saying that God does a thing contrary to nature, when it is contrary to what we know of nature. For **we give the name nature to the usual common course of nature** (*appellamus naturam*, *cognitum nobis cursum solitumque naturae*) and whatever God does contrary to this, we call a prodigy (*magnalia*) or a miracle (*mirabilia*). But against the supreme law of nature, which is beyond the knowl-

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natura naturans and *natura naturata* constitute a lexical innovation widely circulated from the beginning of the thirtheenth century. This distinction separates created nature, that is to say, creation as a whole and the principles that govern it from creative nature identified with God Himself. It was prepared by the interest in nature that developed in the twelfth century and which we mentioned earlier.

In fact, all the definitions of nature, in the twelfth and thirteenth centuries, are explained in terms of the relationship between God, nature and man. In the *Speculum naturale*, Vincent of Beauvais, a Dominican, takes into account the entire philosophical and theological legacy available to him in order to give a complete idea of these relationships. In the twelfth century, in a theology influenced by Neoplatonic philosophy as transmitted and Christianized by Augustine, the world is an image of God, a book accessible to all, both literate and illiterate. The conception of nature reinforces revealed theology and thus strengthens divine power. God, nature and man are conceived as creative forces with delineated spheres of action.

In this context of the repartition of creation, another passage quoted by Vincent of Beauvais in the *Mirror of Nature* clarifies the previous one. It is found in Book XXIX, Chap. 46, concerning the "four distinct operations", that is to say, the "four differences between the works of creation". This chapter consists of a quotation from the theologian Hugh (1096–1141), canon of the Abbey of Saint-Victor, in Paris, in his homily 16 on *Ecclesiastes*, which covers all cases regarding the distinction between:

- The work of God which operates *aliquando sine natura*, *aliquando in natura*, *aliquando supra naturam* (sometimes without nature, sometimes in nature, sometimes beyond nature)
- The work of nature
- The work of man that is accomplished "sometimes with God without nature, sometimes without God and with nature, sometimes with God and nature together, and sometimes without God and without nature" (*aliquando* cum *Deo sine natura*, *aliquando sine Deo et* cum *natura*, *aliquando* cum *Deo simul et* cum *natura*, *aliquando sine deo pariter et sine natura*)

These four cases have to cover the explanation of all "temporal things":

edge both of the ungodly and of weak believers, God never acts, any more than He acts against Himself. As regards spiritual and rational beings (*rationalis creatura*), to which class the human soul belongs, the more they partake of this unchangeable law and light, the more clearly they see what is possible and what is impossible; and again, the greater their distance from it, the less their perception of the future, and the more frequent their surprise (*miratur insolita*) at strange occurrences. (Augustine, *Contra Faustum*, transl. by R. Stothert, rev. and ed. for New Advent by Kevin Knight. http://www.newadvent.org/fathers/1406.htm).

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Doc. II: Hugh of Saint-Victor, Homily 16 on *Ecclesiastes*, after *Speculum naturale*, XXIX, Chap. 46, *De quattuor differentiis operationum* (ed. Douai 1624, col. 2096e-97c)

Hugo super Ecclesiasten homilia XVIa*:* ***Quatuor*** *sunt opera quibus omnia temporalia explicantur.* *Primum* *est opus dei,* *secundum* *nature,* *tertium* *artificis* cum *natura,* *quartum* *solius artificis sine natura.*	Hugh on Ecclesiastes, Homily XVI: All things that exist in time are explained by **four works**. The first is the work of God, the second is the work of nature, the third is the work of the craftsman with the help of nature and the fourth is that of the craftsman alone without nature.
(1) ***Opus dei*** *est essentiam rerum de nihilo creare, materiam rerum informem disponere, motum autem rerum sub certo ordine temperare, propterea tria hec ad opus dei pertinent* id est *essentia rerum et forma et ordo. Hec autem tria de operibus dei stabilia sunt nec temporis capiunt mutabilitatem et rerum essentie hoc quod sunt nunquam esse desinunt et rerum forme secundum primam conditoris sui institutionem in suis generibus perpetuam identitatem custodiunt et motus rerum primum ordinis legem nunquam transcendunt. Neque enim vel essentie rerum nihil esse vel forme rerum aliter esse vel ordo rerum dispositioque* ab initio *mutari potuerunt.* ***Opus itaque, dei est, creare, formare, disponere universa****.*	(1) The **work of God** is to create the essence of things from nothing, to arrange the shapeless matter of things and to give a certain order to the motion of things, which is why these three things belong to the work of God, namely, the essence of things, their form and order. These three Godly operations are stable and do not undergo the variations of time; the essence of a thing never ceases to be what it is; in their form, things preserve a perpetual similarity that conforms with what was originally instituted by the Creator for each genre, and the motion of things never surpasses the order originally decreed. For the essence of things has never not existed, nor have their forms been different, nor have their order and initial arrangement been modified. **God's work therefore consists in creating, giving form to all things and arranging them**.
(2) ***Opus nature*** *est semina rerum de occulto per incrementum producere eademque rursum marcentia cum concidunt per defectum ad occultum sinum unde prodierant revocare.*	(2) The **work of nature** is to bring out gradually, from the hidden place, those things that are sown, and, when they lose their vitality and die out, to return them to the secret breast whence they came.
(3) ***Opus artificis*** **cum** ***natura*** *est, ea que oriuntur de terra studio et industria adiuvare.*	(3) The **work of the craftsman with the help of nature** is to treat with care and skill all that is born of the earth.
(4) ***Opus solius artificis*** *in subiecta rerum materia operari vel disiuncta componendo vel coniuncta separando.*	(4) The **work of the craftsman** alone is to act upon the matter of things subject to him, either by uniting that which is separated or by separating that which is bound together.

(continued)

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Tres itaque opifices *sunt in hoc mundo.* ***Deus****,* ***natura*** *et* ***artifex imitans naturam****. Sed hi tres valde dispari potentia id quod ad effectum perducunt, efficiunt. Nam deus in opere suo nec nature opera indiget nec opificis imitantis naturam. Operatur* ***enim deus aliquando sine natura, aliquando in natura, aliquando supra naturam.*** *Nam sine natura primum fecit ipsam naturam,* cum *natura facit ea que de natura secundum naturam producit. Supra naturam quando in natura preter cursum nature solitum et posse primum maiori addita potentia aliquid ad effectum perducit.* ***Omne ergo quod natura facit deus facit, sed non omne quod deus facit, natura etiam facit.*** *Tertio loco sequuntur opera artificis imitantis naturam. Et ipse quidem aliquando* cum *deo operatur sine natura. Aliquando sine deo et* cum *natura. Aliquando* cum *deo simul et* cum *natura. Aliquando sine deo pariter et sine natura.* Cum *deo operatur, quando opera iustitie, sine deo, quando opera iniquitatis operatur.* Cum *natura quando in seminibus rerum ac fetibus propagandis quibus natura incrementum subiicit: foris industriam et studium apponit. Sine natura, quando preterea in subiecta materia studium explicat ut aliquid quodcunque ad effectum promoveat, in quo natura patitur tantum, non operatur, quia materiam operandi prebet, non autem effectum operantis exercet.* ***Talia sunt omnia opera hominum****, que fiunt super terram, ex quibus multa mortalis vite necessitas cogit, multa suadet cupiditas, multa vanitas operatur.*	There are therefore **three kinds of creators** in this world: **God, nature and the craftsman who imitates nature.** However, whatever they bring about, they do so by a very different power. For God in his work needs neither the work of nature nor that of the craftsman who imitates nature. Indeed, **God sometimes operates without the help of nature, sometimes within the limits of nature**, **sometimes beyond nature**. For it was without the help of nature that he first made nature herself; with the help of nature, he makes all of nature's creations according to the laws of nature. He operates beyond nature when, within nature, he performs something that goes beyond the usual course of nature and its primary capacity, by imparting greater power to it. **Thus, whatever nature does, God does, but all that God does is not necessarily done by nature.** In the third place are the works of the craftsman who imitates nature. The craftsman sometimes operates with God without the help of nature, sometimes without God and with nature and sometimes with both God and nature, and sometimes without God and without nature. He works with God when he performs works of righteousness and without God when he performs works of iniquity; with the concurrence of nature, when he applies himself with care and skill to propagating the seeds of things and the offspring by which nature grows; without nature, when, in addition, he toils with the matter submitted to him in order to obtain something, an operation in which nature plays a passive role, she does not act, because she provides the matter for the operation and does not play the role of the worker. **Such are all the works of men**, which are made on earth: the necessities of mortal life require many of them, many are aroused by avarice and vanity provokes many.

Earlier, in Book II, Chap. 5 of the *Mirror of Nature*, Vincent of Beauvais had already collected the words of a contemporary of Hugh of Saint-Victor, the canon, scholar and theologian William of Conches, active in the Chartres canonical school.[19] In his *Dragmaticon*, William delineates the *opus creatoris* and the *opus naturae*, as well

[19] *Speculum naturale* II, Chap. 5, ed. Douai 1624, 82c-d: Guilhelmus de Conchis: *Sed fortasse dicet aliquis: creator, qui omnia solo dicto creavit et antequam fiant cognoscit. Cur* ***ex quattuor elementis*** *illud composuit quod non diu permansurum cognovit? Opera inquam creatoris videmus: sed causas ignoramus: quod tamen nobis inde videtur, dicemus. Omne opus vel est* ***creatoris*** *vel* ***nature*** *vel* ***artificis****. Opus creatoris est elementorum et animarum ex nihilo creatio, mortuorum resuscitatio: partus virginis et similia. (= Dragmaticon*, I, Chap. 7.2, l. 16–25, ed. Ronca, Badia,

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as the *opus hominis*, that is to say, the respective creative works of God, nature and man. He specifies the status of man as *artifex imitans naturam*: a craftsman imitating nature, in the making of clothes to compensate for nature's indigence, for example. However, he added that neither nature nor the craftsman could equal God. In a desire to link physics and creation, Hugues also says that God created everything from the four elements, in ways that remain hidden from us, but, in order to distinguish this from the course of physical nature, he adds that He had also created the souls, the resurrection of the dead and the birth through the Virgin:

> But someone could argue: The Creator created everything with his word alone and knows everything before it comes into being; why then did He combine something out of four elements, which He knew would not last for long. I'll say that we see the works of the Creator, but we are ignorant of the causes. We shall say what we think about this question. Everything is the work of either the Creator, or nature, or a craftsman. The work of the Creator is the creation of the elements and the souls from nothing bringing the dead back to life, causing a virgin to give birth, and such like. Nature is a certain force implanted in things, producing similar from similar. It is, therefore, the work of nature that men are born of men, asses from asses, and so on. But whatever is constructed by man to provide for his natural needs, such as clothes against cold or a house against inclement weather, is the work of a craftsman. But when nature produces a certain thing, she produces something rough and confused at first, then gradually forms and divides it: first she produces must, then she drags what is sedimentary and heavy in it to the lowest place, whatever is light to the top, and what is in between to the middle place. (…) Therefore, because nature and the craftsman were unable to come up to the Creator's work, the Creator determined to come down to their standard. For, if this were not so, it would be thought to be a weakness in nature whenever things were created mixed by her. Or, as others say, God created a mixed thing to show how much confusion of things was possible if his own love were not ordering them. When Plato said, "every physical object floating with an aimless movement », he had in mind the natural motion of the elements, by which two move toward the center, two away from the center. And when he said, "He reduced to order from a disordered agitation", he did not mean an agitation that actually existed, but one that might have existed, had He not ordered things in this way. (William of Conches, *A Dialogue on Natural Philosophy*, transl. by I. Ronca and M. Curr, Notre Dame 1997, p. 18–19)

Pujol 1997, 29–30). ***Natura*** *vero est, quedam* ***vis rebus insita****, similia de similibus procreans.* ***Opus*** *igitur* ***nature****, quod homines ex hominibus nascantur, asini de asinis et* sic *de aliis:* ***opus*** *autem* ***artificis*** *est, quod ab homine contra naturales indigentias componitur: ut vestis contra frigus: contra aeris intemperiem domus. Sed* cum *natura aliquod operatur, primo quoddam commixtum operatur, deinde paulatim format et dividit: prius namque operatur mixtum: deinde quod in eo est feculentum et grave ad infimum locum trahit quod vero leve est, ad supremum, quod mediocre ad medium locum. (…)* ***Quia igitur natura et artifex non poterant ad operationem creatoris ascendere****: voluit creator ad illorum operationem condescendere. Si enim hoc non esset: debilitas nature putaretur quotiens ab ea aliqua mixta crearentur. Vel ut alii dicunt,* ***mixtum*** *creavit, ut significaret quanta* ***confusio rerum*** *esse posset: nisi sua dilectio res ordinaret?* (I, Chap. 7.3–4, l. 38–45, ed. Ronca, 30–31) *Hinc omne corporeum importuno motu dixit Plato fluitans, naturalem motum elementorum considerans: quo duo a centro duo ad centrum moventur et hec inquit ex inordinata iactatione, deus in ordinem redegit scilicet non ex inordinata que fuit: sed que esset, nisi res* sic *ordinavisset.* (*Dragmaticon* I, Chap. 7.6, l. 55–59, ed. Ronca, 32).

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William had already quoted the phrase subsequently taken up by Vincent of Beauvais in item II.1. of our document I: *vero est, quedam* ***vis rebus insita****, similia de similibus procreans*: "nature is called the force which, intrinsic to things, procreates similar beings from the beings that are like them, as a seed germinates a seed of the same species". In this extract II.1 borrowed from Hugh of Saint-Victor, the term "nature" is understood in its biological sense as the natural force intrinsic to every creature, to every individual, which allows the multiplication of the species through similar individuals. This principle ensures the ontological condition for each species by making it impossible for new forms of life to appear. Consequently, any crossing between different species constitutes a failure in this continuum of generation, since the resulting progeny do not have the ability to procreate (such as mules). The encyclopaedias, however, note a few exceptions to this rule, drawn from Pliny's *Natural History* or Aristotle's zoological works recently available in translation[20] but rarely explain them and they leave no room for chance in nature.

These founding principles of Aristotelian zoology are able to rationally explain every animal generation, even those which are exceptions to this rule, namely "imperfect" animals such as certain insects. In Vincent of Beauvais' time, the Dominican master Albert the Great (*ca.* 1200–1280) wrote commentaries on the *History of Animals*. He was interested in the generation of all animals; out of 26 books, the last is entirely devoted to *vermes*, an appellation that coined the word "vermin" which covered all small crawling animals. In their regard (in his commentary on plants this time, *De vegetabilibus*), Albert says that "it is rationally explained that there cannot be generation after generation of young of the same species, in imperfect animals born out of putrefaction or of putrid fluids, while nature tends to perfection".[21] The difficulty of examining the mode of generation of insects without the availability of magnifying instruments led to a degree of uncertainty as to their mode of apparition. Taking up a passage from the famous encyclopaedia *Etymologiae* (written at the beginning of the seventh century by the Visigoth Bishop Isidore of Seville) on the birth of worms in putrefaction, Vincent of Beauvais says in the *Mirror of Nature*, XX, Chap. 68: "Vermin (*vermis*) are animals that are generated for the most part from flesh or wood or some earthy substance, without any sexual congress – but sometimes they are brought forth from eggs, like the scorpion".[22] This is why, as a result of an exegetical reading of this passage taken from Isidore

[20] In the first half of the thirtheenth century, Aristotle's zoology reached the West through the Arabic-Latin translation known as *De animalibus*, made by Michael Scot around 1210–20 (from a ninth-century Greco-Arabic translation). It includes three works: *History of Animals* (Books I to X), *Parts of Animals* (Books XI–XIV) and *Generation of Animals* (Books XV–XIX).

[21] *De vegetabilibus* I, tr. 1, *An vivat planta vel non*, Chap. 4, *De positionibus eorum, qui negant vitam inesse plantis*, ed. Meyer, Jessen 1867, 15. On these passages concerning the generation of worms, see Draelants 2016, sp. 206–9, 2019b.

[22] Cf. Isidore of Seville, *Etymologies*, XII, Chap. 5. (Transl. Barney et al. 2006, 258).

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of Seville, we see a positive virtue of purity in the worm born without prior coupling, which presupposes a birth without concupiscence comparable to that of Christ. Thomas of Cantimpré says in his *Liber de natura rerum*: "Although the name worm is suitable for all worms, strictly speaking what is specifically called a worm, is that which is generated from the ground pure and intact, without any mixing of seed".[23] This rapprochement between the generation of the worm and that of Christ would be a boon for the exegesis of the passage in Psalm 21:7: *ego autem sum vermis et non homo*, "But I am a worm and not a man, scorned by mankind and despised by the people".

All this remains for the course of natural procreation. Conversely, deviation from the natural course of things can only be the work of a miracle, as noted in Part II.3 [Doc. I] of the definition echoing the *Contra Faustum*.

Let us now examine a description of "physics" as a science and no longer as a created universe. This description is given by Vincent of Beauvais himself who specifies that he speaks this time as the author (*actor*), not the compiler. It is found in both the *Mirror of History* and the *Doctrinal Mirror*.[24] In the first, the passage appears under the chapter title "concerning the division of the sciences which are given as a remedy (to sin)". This title was inspired by the way in which the theologian Hugh of Saint-Victor considered knowledge in his *Didascalicon*, a work on learning in which he affirms that knowledge is given to man by God in order to enable him to regain his state before the Fall (original sin), that is to say, the plenitude of his likeness to God. The rest of the chapter, however, distances itself from the theologians of the twelfth century, since it lists, rather than defines, the characteristics of the fundamental concept of "body" according to Aristotelian physics, from the books on nature by Aristotle, translated a century earlier and who is referred to systematically in this passage.[25] The different conceptual elements are subdivided in the scholastic way by successive binary divisions – body, form and matter, corruptibility and incorruptibility, simplicity and composition and inanimation and animation – which interact in a terrestrial world now considered to be dominated by motion. This last concept includes changes of state. These notions return in force in medieval philosophy following the translation of Aristotle's treatises on nature.

[23] Thomas of Cantimpré, *Liber de natura rerum* IX, Chap. 52, *De verme, qui proprie vermis dicitur*. Ed. Boese 1973.

[24] *Speculum historiale* I, Chap. 53, *De divisione scientiarum que et ipse date sunt homini in remedium*, ed. Douai 1624, col. 21a, and *Speculum doctrinale* XV, Chap. 2, *De partibus naturalis philosophie*, ed. Douai 1624, col. 1371d-e, after a first passage taken from Al-Fârâbi's classification of the sciences.

[25] See Frunzeanu 2007, sp. 69–74, for the passages examined here. E. Frunzeanu discussed these elements in a lecture given in 2008 at the University of Nancy.

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Doc. III: Vincent of Beauvais, *Speculum historiale*, I, Chap. 53, *De divisione scientiarum que et ipse date sunt homini in remedium* (Ed. Douai, 1624, vol. 2, col. 21a)

ACTOR: (…) **Physica** idest naturalis scientia tractat de **invisibilibus visibilium causis**, nam corpus et ea que sunt corporis principaliter considerat.	AUTHOR: **Physics**, that is to say, natural science, treats the **invisible causes of visible realities**, for it examines mainly corporal things and all that pertains to them.
Corpus autem consideratur in *generali* cum partibus suis aut in *speciali*. Si primo modo sic determinat illud ARISTOTILES IN LIBRO PHYSICORUM.	The **body** is considered either in *general* with its parts or *specifically*. ARISTOTLE adopts the first method in his book *ON PHYSICS*.
Si in *speciali* aut igitur est corruptibile aut incorruptibile.	Considered *specifically*, the body is thus corruptible or incorruptible.
Si *incorruptibile* sic est IN LIBRO DE CELO ET MUNDO. Dicit enim ARISTOTILES IBIDEM quod celum est corpus non generatum nec fabricatum nec recipiens impressiones aliquas.	The *incorruptible* body is the subject of the TREATISE ON THE HEAVENS AND EARTH. In this book, Aristotle says that heaven is a body which is neither generated nor made and which receives no imprints.
Si sit *corruptibile* aut ergo est simplex aut compositum.	As for the *corruptible* body, it is either simple or compound.
Si *simplex* sic est IN LIBRO DE GENERATIONE ET CORRUPTIONE, et loquor de *simplicitate* illa que opponitur *compositioni* naturali ex quatuor elementis.	The *simple* body is dealt with in the TREATISE ON GENERATION AND CORRUPTION, and I speak here of the notion of *simplicity* which is the opposite of natural *composition* of the four elements.
Si *compositum* aut igitur animatum aut non.	If the body is *compound*, it is either animate or *inanimate*.
Si non sic est IN LIBRO METHEORORUM ubi ARISTOTILES determinat de impressionibus aeris et de generatione grandinis et nivis et corporum mineralium et consimilium.	ARISTOTLE treats the latter in the TREATISE ON METEORS, where he discusses the disturbances of the air; the generation of hail, snow and mineral bodies; and the like.
Si vero sit *compositum animatum*, aut igitur anima vegetativa est animatum – et de tali determinatur IN LIBRO DE VEGETABILIBUS –,	If it is an *animated compound*, in this case it is animated either by the vegetative soul, which Aristotle deals with in the TREATISE ON PLANTS,
aut anima sensitiva et de tali IN LIBRO DE ANIMALIBUS,	or by the sensitive soul, which he deals with in the TREATISE ON ANIMALS,[26]
aut anima intellectiva et de tali IN LIBRO DE ANIMA. Ceteri vero LIBRI DE SOMPNO ET VIGILIA, DE MORTE ET VITA, DE SENSU ET SENSATO, DE DIFFERENTIA SPIRITUS ANIME et cetera, supponuntur LIBRO DE ANIMA et LIBRO DE ANIMALIBUS.	or by the intellective soul, which he deals with in the TREATISE ON THE SOUL. The other treatises ON SLEEP AND SLEEPLESSNESS, ON DEATH AND LIFE, ON SENSE AND THE SENSIBLE, ON THE DIFFERENCE BETWEEN MIND AND SOUL etc. must be subordinated to the TREATISE ON THE SOUL and the TREATISE ON ANIMALS.

The definition of natural science which emerges from this passage considers it both as the science of bodies and as the science of causes. We know that the

[26] In the *Speculum doctrinale*, the quotation stops here to begin Chap. 3.

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Aristotelian definition of philosophical ("scientific") inquiry is specifically the search for causes; this new epistemology was gradually being replaced in the West with the search for "truth" through logic. More exactly, it coexisted with various conceptions of nature and of science, the object of which was nature.

It will be noted that the Aristotelian philosophical discourse is immediately "framed" by a recollection of the quotation from St. Paul to the Romans (I, 20) referring to the visible physical world as a reflection of the heavenly world and invisible divine purpose that also conforms with the Platonic vision of the world mentioned above.[27] However, this allusion also assumes that the causes of powerful physical phenomena can be invisible. This evokes a hermetic doctrine conveyed by Arabic scholars, the so-called doctrine of "occult" (hidden) causes in order to explain phenomena perceived through sensory experience, but whose origin is not obvious.[28]

The end of this excerpt, written as a bibliographical guide to the Aristotelian books of reference for each notion, shows the importance, for medieval authors to allocate all the knowable visible realities within classifications of the sciences and taxonomic subdivisions. All the treatises on natural philosophy mentioned here are by Aristotle or were attributed to him at the time.[29] As we see here, in the thirtheenth century, their dissemination led to a conception of nature as an *intrinsic principle* responsible for the *material* and *formal* fulfilment of every body, whether this body is animated by a type of soul specific to it (vegetative, animal, rational) or whether it is inanimate – the soul being considered as the *form* of the material body.

With regard to the word "physics", it should also be pointed out that around 1230–1240, the word *physica* was still used both for medicine (hence the word "physician" in English) and for natural science. This is why Vincent of Beauvais states:

Doc. IV: Vincent of Beauvais, *Speculum doctrinale*, XV, Chap. 1, *De naturali philosophia.*[30]

Intentio igitur **Philosophie naturalis** est dare **principia** quatuor et **accidentia** et **concomitantia** in omni specie corporis. **Principia**, intellige quatuor **causas**, scilicet materiales, formales et cetera. **Accidentia** vero colorationes, pervietates, asperitates, proprietates, differentias et cetera his similia. Dicitur autem hec scientia proprie **Physica**, **idest naturalis**, quia *physis* grece, *natura* latine licet medici ad sui palliationem hoc sibi nomen attribuant, sed improprie.	The intention of **natural philosophy** is to explain the four **principles** and **accidents** that **accompany** them in every kind of body. By "principles", one must understand the four causes: material, formal etc.; by "accidents", one must understand the colorations, channels, asperities, properties, differences and other characteristics that are similar. In the proper sense, this science is called *physics*, that is to say, "natural", because *physis* in Greek means *natura* in Latin, although physicians use this name to cover their activity but improperly.

[27] See Note 3 for the quotation of Paul to the Romans.

[28] Nicolas Weill-Parot has definitively clarified the notion of "occult", taking into account the earlier literature on this subject. See inter alia Weill-Parot 2010.

[29] Among the pseudo-Aristotelians works are the *De vegetabilibus*, by Nicholas of Damascus (first c. BC), and the *De differentia spiritu et anima*, by Qustâ ibn Luqâ (*ca*. 820–*ca*. 912).

[30] *Speculum doctrinale* XV, Chap. 1, *De naturali philosophia*, ed. Douai 1624, 1371a.

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Aristotle understood *physis* as a process *immanent* in every being, a principle that governs the development of each being, but not as the set of beings or the set of principles through which things develop and interact. Aristotle's fundamental treatise in reference to this idea is *On the Heavens and Earth*. Vincent of Beauvais used extracts from it at the beginning of the *Mirror of Nature*, in a chapter on the sensitive world and the mobility of the elements, following the quotations of Hugh of Saint-Victor [Doc. II] and William of Conches which we have already examined:

Doc. V: Vincent of Beauvais, *Speculum naturale*, II, Chap. 12, *De mobilitate elementorum*[31]

Aristoteles in libro de celo et mundo. Corporibus autem simplicibus est naturalis quies. Res enim aut quiescit **violenter**, aut **quiete** naturali necessario. Et ubi quiescit naturaliter, illuc intendit naturaliter. *Natura* enim est in unoquoque principium sui motus, *virtus* autem est principium motus eius qui est a re alia.	Aristotle in the book On the heavens and earth. Natural rest is specific to **simple** bodies. In fact, something is in a state of rest either by natural necessary **inertia** or **forcibly**. It moves naturally towards the place where it is naturally at rest. In fact, ***nature*** is the **principle of motion** for each thing, and **force** is the principle of motion that is imprinted by something else.

Aristotle defines the relationship between place and motion in relation to the notions of natural motion and violent motion. He explains that *nature* constitutes the intrinsic principle of the motion of every body, a unique natural motion, whereas *virtus*, which could be translated as "force", is the external principle of multiple motions, which belong to another body; *virtue* therefore produces accidental motion without the intervention of nature.[32]

The sense of *physis* in Aristotle ranges from an etiological (related to the causes) and an essentialist (related to the essence) definition on the one hand and a dynamic characterization as a process on the other. For Aristotle, it was indeed the laws of necessity and teleology that took the place of *natura*. Consequently, *physis* represents the "nature of the thing" only as the essential structure of a living thing connected with its purpose, while the properties represent the internal and external characteristics of a living thing which describe it as a specimen of a species. Aristotle considered species as being eternal. By respecting the "final cause", nature seeks the perfection of each species before seeking a balance between them, since the object of Aristotelian teleology is the species and not the animal realm.[33]

At the same time as the Aristotelian vision of the natural world was established, the vision of the naturalist Pliny the Elder (first century) survived in the Middle Ages. Pliny perceived nature as both the totality of all the generated forms (natural and intellectual) and the intrinsic force (the *vis insita* encountered earlier in William

[31] Ed. Douai 1624, col. 86d.

[32] On this passage, cf. Frunzeanu 2007, 183.

[33] Frunzeanu 2007, 70–1.

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of Conches[34]) that supports and holds them together. This conception of nature was compatible with the Christian view. Nature thus has an innate force, specific to each thing (*res*), which determines its form and its behaviour; it is linked to a providential force that governs all beings as well as the relations between them.[35] Thus nature remains a set of principles, ordered and subject to a providential plan.

In accordance with the passage commented upon above [Doc. V], just before the *actor* passage devoted to the definition of nature (Doc. I, "in how many ways one speaks of nature"), in Book XV, Chap. 4 of the *Doctrinal Mirror*, Vincent of Beauvais quotes an extract of a summa on the soul (*Summa de anima*) by one of his contemporaries:[36]

Doc. VI: Vincent of Beauvais, *Speculum doctrinale*, XV, Chap. 4 (Ed. Douai 1624, vol. 2, col. 1372)

> *Ex summa de anima. In naturalibus idem est* ***forma*** *quod* ***natura****, sed forma dicitur respectu materie quam perficit natura vero respectu motuum quos elicit, ut forma ignis. Dicitur autem* ***natura*** *secundum Avicennam quadrupliciter. Primo modo principium movendi uno modo et non sponte, sicut in elementis et elementatis. Secundo modo principium movendi diversis modis et non sponte, sicut est anima vegetabilis in plantis. Tertio modo principium movendi diversis modis et sponte, sicut est anima rationalis in animalibus. Quarto modo principium movendi uno modo et sponte, sicut motus celi, quod est intelligentia. Primo modo dicitur natura proprie. Diffinitur autem in physicis generaliter sic. Natura est principium motus et quietis, eius in quo est, per se et non per viam accidentis.*

In fact, the study of spiritual and intellectual faculties, the object of ancient and medieval psychology, was then highly prized. This quote, relaying Aristotelian physics, identified *form* and *nature* with the following difference: one speaks of form with respect to the *matter* that it completes and of nature with respect to the *motion* that it generates in it. These notions were already well known to the philosopher Boethius (470–525) at the end of Antiquity, who also had an excellent knowledge of Aristotle, whose treatises on logic he translated and who had a strong scientific influence on medieval thought. In his celebrated treatise *On the Trinity*, he considered *physica* as the study of "the forms of bodies as well as of the matter which constitutes them".[37]

In the second sentence, the passage from the *Summa on the soul* quoted by Vincent of Beauvais, refers to the theories of Avicenna. In an awkward formulation, he translates the Aristotelian principle of nature as a principle of motion. By taking as criteria the simplicity or the diversity of motion as well as its voluntary or not voluntary (*sponte*) character, he divides all natural realities according to four pos-

[34] See Note 19 and the following translation in the body of the chapter.

[35] French 1994, 199.

[36] For the source used by Vincent of Beauvais, see Gauthier 1982, 34, l. 154–169.

[37] Boethius, *De trinitate*, II, ed. Moreschini 2000, 168–9: *Nam* cum *tres sint speculativae partes, naturalis, in motu inabstracta anupexairetos (considerat enim corporum formas* cum *materia, quae a corporibus actu separari non possunt: quae corpora in motu sunt ut* cum *terra deorsum ignis sursum fertur, habetque motum forma materiae coniuncta)…*

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sible combinations. Each of these types of motion correspond to a type of soul – of animation – which characterizes each of the natural realm:[38]

- The simple motion (regular) and non-voluntary that is specific to the elements and the "elemented"
- The diverse (multidirectional) and non-voluntary motion that one observes in the vegetable/vegetative soul of plants
- The diverse and voluntary motions perceptible in the rational soul of animate beings
- The simple and voluntary motion which corresponds to the motion (or motor)[39] of the heavens, in other words to intelligence

The text emphasizes that the term *nature* can only be applied appropriately to the first type and therefore to the motion specific to the elements (*elementa*) and to the elemented (*elementata*). This notion of *elemented* was used to designate compound bodies is peculiar to Salernitan medicine; it is also found at the beginning of the thirteenth century among English authors who were familiar with it. *Elementum* refers to the element in its pure state, and *elementatum* indicates the same element but mixed with other elements in sensitive things: the element as it is perceived in reality.[40] These terms correspond to the notions of "nature natured" and "nature naturing" we encountered in Document I. The *nature natured* (engendered nature) can designate compounds, while the *nature naturing* is that which governs their composition.[41]

Then, two other quotations in Vincent of Beauvais' *Speculum Doctrinale* introduce definitions of nature in relation to the essential and recurring philosophical concepts of matter, substance, form and species. These quotations are found again in Book XV, this time in Chap. 3, entitled "Nature and its operation". Vincent of Beauvais took these definitions from Aristotle's *Physics* and from the *Fons Vitae* by Ibn Gabirol (1020–1054/8), a Neoplatonic philosopher from Zaragoza, with a good knowledge of Aristotle, who wrote the "Source of Life": *Fons vitae*, based on the doctrine of hylomorphism. That is to say, all creatures, both spiritually and bodily, are composed of matter and form and allow an advancement towards the knowledge of Divine Will.

As we have seen, Vincent of Beauvais is one of the authors who, in the years 1240–1250, used the syntagms *natura naturans* and *natura naturata* in order to

[38] Cf. Frunzeanu 2007, 96.

[39] Actually, the text on the soul, edited by Gauthier 1982, uses *motor* (motor) and not *motus* (motion) as in Vincent of Beauvais' text, which I have verified in the manuscripts.

[40] For example, the Earth would be an *elementatum* according to Ralph of Longchamp *ca*. 1212. On this concept, see Silverstein 1954.

[41] In his translation of the *Introductorium maius ad scientiam iudiciorum astrorum* of Abu Maʿshar, made in 1140, Herman of Carinthia used the words *naturatum et natura* where John of Seville, (in his own translation of the same text in 1133), used the words *elementata* and *elementans* to distinguish the compound bodies and the cause governing this composition. See Weijers 1978, 70.

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nuance the similarities between God and nature. Yet, from 1250–1260, other Dominican voices emphasized, in the light of Christian theology, the incongruities of these doctrines influenced by Arabic philosophy.

The German philosopher and theologian Albert the Great, in his commentary on the treatise on divine names (*De divinis nominibus*) attributed to Dionysius the Areopagite, emphasized that the similarity proposed by the Cordoban Averroes (1125–98) between universal nature (*natura universalis*) and the divine art (*ars divina*) was based on "the opinion of those who distinguish a dual status of nature, namely the *natura naturans* (nature that begets nature) and *natura naturata* (begotten nature), and say that God is the *natura naturans*". However, Albert says, "we find no philosopher nor holy father who calls God 'nature' except in the case where we speak of the Father as the principle of the generation of the Son; furthermore, we cannot properly call 'nature' what is foreign to all natural things. If, however, we wanted to save the remarks of the Commentator [Averroes] and call 'nature' the divine art, it would be equivocal, just as if we called the sculptor the statue".[42]

Also in contexts seeking to explain the meaning of "universal nature" we find in the theology of Thomas Aquinas, who attended classes by Albert the Great, two critical details against the equivalence between God and *natura naturans*,[43] the partisans of which remain anonymous (*quidam*). Along with Albert, with whose text passages by Thomas bear great affinity, the Aquinate suggests bringing *natura universalis* closer to a celestial virtue/force proceeding from the principles of all natural things and their motions. This notion goes back to a hermetic doctrine.[44]

However, Vincent of Beauvais did not seem to be wary of the concept, to which he gave only limited space, presenting it as a novelty illustrating the debates between natural philosophers of his time. The reticence shown by the other two Dominicans in the use of *natura naturans* is partly explained by their attempt to differentiate and

[42] Albertus Magnus, *Super Dionysium de divinis nominibus,* ed. Simon 1972, 281: *Dicendum, quod hoc quod Commentator nominat divinam artem* ***universalem naturam****, videtur esse secundum opinionem illorum, qui distinguunt duplicem naturam, scilicet naturam naturantem et naturam naturatam, dicentes naturam naturantem deum. Sed hoc non invenitur nec ab aliquo philosopho nec ab aliquo sancto, quod deus dicatur natura, nisi inquantum in patre est principium generationis filii; nec proprie dici potest, ut quod est extrinsecum omni rei naturali, natura dicatur. Si tamen, ut salvetur dictum Commentatoris, divina ars dicatur natura, hoc erit aequivoce dictum, sicut diceretur statuarius statua.*

[43] Thomas Aquinas, *Summa Theologiae*, I-II, qu. 85, a. 6: *Natura vero universalis est virtus activa in aliquo universali principio naturae, puta in aliquo caelestium corporum; vel alicuius superioris substantiae, secundum quod etiam Deus a quibusdam dicitur natura naturans. Idem, In de divinis nominibus,* Chap. 4, l. 21: *Est autem Deus universalis causa omnium quae naturaliter fiunt; unde et quidam ipsum nominant naturam naturantem.* "On the other hand, the universal nature is an active force in some universal principle of nature, for instance, in some heavenly body, or again belonging to some superior substance, in which sense God is said by some to be 'the Nature Who makes nature'" (The *Summa Theologiae*, online 2016).

[44] Albertus Magnus found the concept of universal virtue in the works of a German collegue, Arnold of Saxony (Arnoldus Saxo), who wrote two decades earlier. (Draelants 2003). The concept of "universal nature" was recently discussed in Weill-Parot 2013, Chap. 1.

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specialize as much as possible the role of God and the role of nature in the processes of creation. Furthermore, the question of preserving for God a capacity for action that went beyond that which is created naturally. Instead of *natura* id est *Deus* – nature, that is to say, God – they preferred to think in terms of several distinctions between God, universal nature, particular nature and natural things.

As shown by the various passages examined, all taken from a mid-thirteenth century *summa* intended to train preachers: without being syncretic, the Middle Ages inherited a large number of doctrines on nature, from all periods, with which scholars tried to compose a picture that accurately accounted for the multiple facets of reality, divine and human, celestial and terrestrial.

2.3 Definitions of Nature in Two Medieval Dictionaries

Another means to have access to the medieval meanings of the notion of nature is to open medieval dictionaries, tools designed in the form of alphabetic or thematic lexicons, which succeeded the glossaries of the early era. Two other definitions, about 80 years apart from each other, chronologically frame those collected by Vincent of Beauvais in the middle of the thirteenth century and provide access to all the common and general meanings of the concept of nature.

The first is provided by the theologian and philosopher Alain of Lille (1125/30–1203); taken from his theological dictionary made up of successive distinctions, that is to say, subdivided definitions, destined to be used in teaching through preaching. This work reveals the cross-fertilization of Neoplatonism and Aristotelianism in Boethius (ca. 450–524), who inspired Alain of Lille. By the authority of Boethius, he explains that the beginning of the definition adopts an epistemological perspective, based on the theory of knowledge and the doctrine of perception.

The second definition is shorter and later, taken from the dictionary by John of Genoa († 1298), written in 1286.[45] It is based on an etymology of the word "nature" derived from "to be born" (*naître* in French, *nascere* in Latin). One might expect, in view of the period when it was written, that it would take into account the fusion of Neoplatonic and Aristotelian traditions in which the scholastic thinking of the thirteenth century engaged in. In fact, its content reveals a conservative etymological tradition going back to the encyclopaedia of the Visigoth Bishop Isidore of Seville entitled *The Etymologies* (completed in 622, it had an enormous influence on the Latin West); on the other hand, it also transmits elements of Alain of Lille's dictionary.

[45] E. Frunzeanu presented the elements taken from the dictionaries of Alain of Lille and John of Genoa during a talk given for medievalists in 2008 at the University of Nancy.

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Doc. VII: Alain of Lille, *Distinctiones dictionum theologicalium* (Ed. Migne, *PL* 210, col. 871a–d)

1. ***Natura*** aliquando ita large sumitur, quod omne illud, **quid quo modo potest intelligi**, natura dicatur; unde Boetius: *Natura est quidquid quid quo modo intelligi potest.* Secundum hanc expositionem, et ***hyle*** et Deus potest dici *natura*; quia, quamvis *hyle* proprie intellectum capi non possit, sed tantum per **formae abnegationem**, tamen quo modo intelligitur. Similiter *divina forma*, quamvis tantum intelligatur per materiae remotionem, tamen quo modo intellectu capitur.	1. **Nature** is sometimes understood in such a broad sense that what we call "nature" **is anything that can be grasped by the intellect in any way**. Hence Boethius: *Nature is anything that can be understood in any way*. According to this definition, **matter** (*hyle*) as much as God can be called *nature*. For, although *matter* cannot be properly understood by the intellect but only by an **abstraction of the form**, it remains that it is understood in a certain way. Similarly, the *divine form*, although it can only be understood by its distancing from matter, is nevertheless understood by the intellect in a certain way.
2. Aliquando sumitur **in designatione substantiae** tantum, unde Boetius: *Natura est quidquid agere vel pati potest;* et secundum hanc acceptionem, Deus potest dici *natura*, quia ipse est *causa* universorum *efficiens*.	2. Sometimes nature is understood only to designate **the substance**. Hence Boethius, *Nature is something that can act or suffer*. In this sense, **God** can be called ***nature*** because He is the *efficient cause* of all things.
2.1. Restringitur tamen hoc nomen *natura* **circa substantiam corpoream**, unde Boetius: *Natura est principium motus* per se *et non* per accidens*;* hoc enim tantummodo pertinet ad substantiam corpoream ut sit **principium motus per se**, id est ut principaliter et per se moveatur; ipsa enim sola proprie movetur aut a centro ad circumferentiam, ut levia, scilicet ignis et aer; aut a circumferentia ad centrum, ut gravia, scilicet terra et aqua.	2.1. In a restricted sense, the term *nature* applies to **the bodily substance**. Hence Boethius: *Nature is the principle of motion in itself (intrinsic) and not by accident.* This meaning pertains only to the bodily substance in so far as it is the **principle of motion per se**, which is to say that bodily substance sets itself in motion as if by its own principle. It moves effectively by itself, either from the centre to the circumference, like fire and air and light elements, or from the circumference to the centre, like earth and water and heavy elements.
2.2. Restringitur etiam **circa substantialem differentiam** et **specificam** quae adveniens generi facit speciem, ut hoc universale rationabile, unde Boetius: *Natura est reformans specificam differentiam.*	2.2 (The term nature), as a **rational** universal notion, is also restricted to **the substantial and specific difference** which occurs when the species is delineated within the genus. Hence Boethius: *Nature repeats the formation of the specific difference.*
2.3. Dicitur esse **substantiale rei per quod res nascitur**, id est suum esse ingreditur; unde dicitur Christus duarum naturarum, quia tam humanitas quam divinitas est esse Christi.	2.3. It is said that (nature) is **the substantial being of the thing by which this thing is begotten**, namely, by which its being is engendered. Hence, it is said that Christ has two natures, because both humanity and divinity are the essence of Christ.

(continued)

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3. Dicitur **origo**, unde dicitur quod angelus *de natura* habuit peccare, id est ab origine habuit libertatem arbitrii ad bene agendum vel male; unde PLATO IN *TIMAEO* introducens Deum loquentem ad angelos ait: *Dii deorum natura quidem indissolubiles.*	3. (Nature) is said to be **the origin**, whence it is said that the angel had *by nature* the ability to sin, which is to say that from the origin he had free will to do good or evil. Hence PLATO, IN THE TIMAEUS, introduces a god who says to the angels: *The gods are by the nature of gods incorruptible.*
4. Dicitur etiam **complexio**, unde: *Physica res diversas diversarum naturarum asserit,* id est complexionum.	4. It is also said to be **temperament**, hence this definition: *medicine deals with the different states of different natures*, that is to say, temperaments.
5. Dicitur **vitium inolitum pro natura**, unde in iure consuetudo dicitur altera natura; et homo dicitur mori de natura, id est ex vitio inolito pro natura.	5. It is said to be **corruption that takes the place of nature,** so that it is rightly said that habit is a "second nature"; and it is said that man dies "by nature", that is, because of corruption that takes the place of nature.
6. Dicitur **naturalis calor**, unde physicus dicit esse pugnam inter morbum et naturam, id est naturalem calorem.	6. It is called **natural heat**, whence the physician says that there is a struggle between disease and nature, that is to say, natural heat.
7. Dicitur **naturalis ratio**, unde APOSTOLUS ait quod *gentes, quae legem non habent, naturaliter quae legis sunt faciunt,* id est naturali instinctu rationis; et secundum hoc solet dici quod natura dictat homini ut non faciat aliis quod sibi non vult fieri, id est naturalis ratio.	7. It is called **natural reason**, whence the APOSTLE says that *the peoples who know no law, naturally do what belongs to the law*, that is to say, through the natural instinct of reason. Hence we are accustomed to saying that nature – that is to say, natural reason – dictates that man should not do to others what he does not wish to be done to himself.
8 [cf. 2.2.]. Dicitur **potentia rebus naturalibus indita ex similibus procreans similia**, unde ALIQUIS dicitur fieri secundum naturam; unde HILARIUS ait quod *Creator factus est creatura, non est naturae ratio, sed potestatis exceptio*.	8. It is said to be **the power which is in natural things, procreating similar beings from the beings that are like them.** Whence it is said that someone is made "according to nature". Hence HILARY [of Poitiers] says that [if] *the Creator made himself a creature, it is not by reason of nature, but by an exception within (his) power*.

In item 2.2, we find the explanation given by the medieval scholastic of "specific natures", based here on a quotation from Boethius going back to the end of the fifth century. These specific natures correspond to the ontological value specific to each "substantial form". The operations specific to each of these forms, through their specific properties, make it possible to infer, by means of reason, the substantial form of every material thing. This special/specific essence of the being, manifested in its operations meant to differentiate it from other beings, is called *nature*, distinguishing the species from the genus. There is here an identification between *substance* and *nature*. Substance is the being which exists in itself, acts and suffers and which is the base of properties and operations which do not have this constancy but which are seen as "accidents" of the form.

Item 4 shows that, following the circulation of medical theories of Greek and Arabic origin, the nature specific to each biological creature, to each body, had been translated in terms of temperament or *complexion*, that is to say, of composition made up of a combination of the qualities derived from four primary elements: cold,

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hot, wet and dry. In the school of Chartres, where fragments of ancient Galenic medicine circulated at the beginning of the twelfth century, the theologian William of Conches had already said that *physica* concerned "nature and the complexion of bodies" (refering to the end of Doc. IV on medicine as *physica*) and that Plato's *Timaeus* contributed to this science when speaking of the "four elements, the creation of animals, and primordial matter".[46]

From the fifth part of the definition, the notion of unnatural nature or at least of obstacles to nature is introduced in various ways, the first, already encountered, being miracles (item II.3 of the first definition in, Document I). The course of nature, dependent on intrinsic properties, is constantly threatened by several factors. Thus, the confluence of certain circumstances may alter the original nature and thus institute a "second nature", whether in the domain of moral conduct, regulated by the canon law, or in the field of biology.

In the case of moral conduct, as mentioned in item 7 (in Alain of Lille), "natural reason" makes it possible to know what should not be done to others as we would not want done unto us; we may be surprised that in Alain of Lille, as it was the case with Vincent of Beauvais later, it is not explicitly stated that this is about sin, whereas Augustine's *Contra Faustum* (which we have identified above as the source of a part of the first definition of nature in the *Doctrinal Mirror*) clearly defined sin as acts "against nature".[47]

In the case of biology, the "other" or "second nature" may be disease, due to imbalances in temperament (items 4 and 6) or it could be, from the ontological point of view, a kind of resistance of matter to the action of the form which would make an individual dissimilar to his parents, but these cases concerning exceptions to "Aristotelian" generation (such as the "imperfect" worms mentioned above), are not taken into consideration. The exception mentioned in item 8 is *divine* nature, which engendered the son of God made man.

Doc. VIII: John of Genoa, *Catholicon* Ed. Venetiis 1487, revised with the manuscripts Paris, BnF, Latin 7629, f. 234vb; BnF, Arsenal 978, f. 230rb; Montpellier, B.M., 8, f. 365va

Natura a *nascor, nasceris* ; dicitur haec *natura, naturae*, id est **nativitas**.	(2.3) The word nature derives from the verb *nascor*, *nasceris* and one says *natura*, *naturae*, in the sense of **birth**.
Et natura dicitur deus quia omnia creat et nasci facit.	(2) God is called nature, because He creates everything and gives birth to everything.
Et natura dicitur quaelibet **creatura**.	Every **creature** is also called *nature*.
Et natura dicitur **complexio**.	(4) Nature also has a sense of **temperament** (*complexion*).

(continued)

[46] William of Conches, *Glosae super Platonem*, X.18–19, ed. Jeauneau 2006: ***Phisica*** *vero est de* ***naturis*** *et* ***complexionibus*** *corporum: 'phisis' enim est natura*; XI.7–8: (…) *ubi vero de quatuor elementis et creatione animalium et de* ***primordiali materia****, de phisica*.

[47] See the *Contra Faustum*, Note 18.

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Et natura dicitur quedam **vis** naturaliter rebus insita de similibus similia procreans.	(8) And we call *nature* a **force** which, naturally intrinsic to things, procreates similar beings from the beings that are like them.
Natura etiam dicitur quedam **significatio** vocabuli, quia significatio causa est quare vocabulum nascatur, id est imponatur.	(9.1) We also call *nature* the **meaning** of a word, for the meaning is the reason why a word originates, namely, that it is attributed (to a reality).
Natura etiam dicitur **impositio** vel inventio vocabuli quia vocabulum nasci nihil aliud est quam ipsum inveniri vel imponi. Vide supra in *miraculum.*	(9.2) *Nature* is also called the **attribution** or the invention of a word, because the birth of a word is nothing other than the fact of finding or imposing it. See above the "miracle" section.

The respective definitions by Alain of Lille and John of Genoa consider (like the definition taken from the *Speculum Doctrinale* examined above, Doc. I) nature as characteristic to all created reality and as the sum of all the visible realities. It may be also noted that John of Genoa simplified the various meanings of the word "nature" given by Alain of Lille. As a good lexicographer, heir to Isidore of Seville, he added the relationship between the word and its meaning and also the reality to which it relates. He says that both the emergence of what the word means and the attribution of a reality to this word are governed by nature. Pursuing creation – as *nature naturing* – it gave rise to both reality and the term to designate it in the mind of man who, like Adam the *onomatothete*, *names* things and is therefore also the continuator of creation. In reality, the reason why the definitions by Alain of Lille and John of Genoa are so close to one another is that John took, almost literally, the text of the *Derivationes*, a kind of dictionary written by an Italian lexicographer, Hugh of Pisa (1140–1210), who wrote them at the same time as Alain of Lille's *Distinctiones*.[48]

It can also be noted that John of Genoa did not keep a single notion derived from natural law. The concept of natural law was born from theological reflection and was developed during the thirteenth century. The notion derived from it evoked the sentence in Alain of Lille: "(nature) is said to be *corruption which takes the place of nature*, so that it is rightly said that habit is a 'second nature'; and it is said that man dies 'by nature', that is to say, because of corruption that takes the place of nature". In fact, at the turn of the twelfth and thirteenth centuries, the natural law was distinguished from both the law of the Scriptures and the divine law, in order to identify it with a fundamental disposition of human cognition.

Citing Guerric of Saint-Quentin, a Dominican master in the 1240s, natural law refers to the universal concepts of the mind (*communes animi conceptiones*), which are distinct from the *cultural* principles of laws, for, as Guerric remarks, those who hear that stealing is forbidden do not necessarily understand the illegality of the act. By means of these common concepts, men are able to apprehend and think what to do or not to do. *Natural* law, which is also distinct from codified norms and legal customs, acquires a content of universality, connected to man as a *species* and not only as people of God.

[48] Hugh of Pisa, *Derivationes*, ed. Cecchini 2004, 821.

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2.4 The Place of Wonder and Space Outside of Nature

The definitions of nature are all based on the analogy and comparison enabling man to understand the whole universe, macrocosm and microcosm at the same time: as Boethius said, taken up by Alain of Lille, nature is "all that can be understood in a certain way".

Alongside the positive definitions of nature discussed thus far, there are, however, several forms of *negative* definitions, in the photographic sense of the word, which make it possible to reveal an intaglio image of nature between the similar and the different. This is especially the space occupied by "wonder" that arouses astonishment and admiration or was seen as a sign of the intuition of the existence of God or that of the hereafter. In fact, the medieval universe, as it appears through the written sources, is not only natural. It comprises several regions that remain unfathomable, unattainable through human cognition, atemporal and irreducible to the categories of intrinsic property and resemblance. These are, firstly, the three eschatological spaces, hell, purgatory and heaven, although some believed them to be on Earth. Nevertheless, on Earth, too, there were unnatural regions: parts of the unknown world, inhabited by monstrous races, dealt with in various encyclopaedias, especially that by Thomas of Cantimpré, written between 1230 and 1255, who devoted a whole book to them.[49] This is the *finis Africae* (the boundary of Africa) of many Renaissance era portulans and geographical maps.

And even within the natural order of species, a fantastic world of mythological or Christian inspiration attributed properties to certain species which transgressed the course of nature, either because of the impossibility of being transplanted, cultivated or raised, as is the case with balsam and barnacle geese,[50] or because of their uniqueness, as is the case with the phoenix which does not reproduce. In view of these particular cases, one can conclude that the course of nature does not correspond to a perfect mechanism but remains vulnerable to certain upheavals due to the vagaries of matter or to the direct and rare intervention of God through miracles. As a result, nature understood as the totality of the created things can neither be understood nor controlled in its entirety.

However, learned thirteenth-century scholars had the desire to explain everything with the help of reason. In the tradition of treatises on the "nature of things" written since Antiquity, they asserted that there are visible and undeniable properties which make it possible to understand the "operations" specific to compound bodies (animals, plants and stones) and thereby their nature; these are illustrated, for example, in their therapeutic virtues. Their cause, if not obvious, was supposed to originate in the intrinsic "force" (*virtus*) that characterizes bodies and specifies them. Properties that manifest this specific nature could generally be explained by the interaction of the elementary components of the complexion of the thing (quali-

[49] This is Book III, *De monstruosis hominibus*, by Thomas Cantimpratensis, *Liber de natura rerum*, ed. Boese 1973.

[50] Cf. Van der Lugt 2004.

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ties of coldness, heat, humidity, dryness and their proportions) thanks to the Aristotelian and the Galenic theory of humours and complexions. However, certain "wondrous" properties that were well known and experienced, but unusual, such as the attraction of magnets, the ability of aetite to prevent drunkenness or the dissolving virtue of rhubarb, did not allow the identification of an elementary cause. This is why, under the influence of the Arabic philosophy of Avicenna in particular, the doctrine of the "occult cause" was born during the thirteenth century. In a way, it would bring back *into* nature phenomena that would have been destined to be beyond it; in the same way, magical virtues could be explained through "sympathetic" properties brought back into the course of nature.[51]

2.5 Conclusion

Without reiterating each of the definitions of nature that have just been covered, some highlights are to be emphasized in the theoretical investigation of nature carried out in the medieval era. First, in comparison with today, the space considered by medieval man's thinking was endowed with a more complete universality: finite time and eternity were both part of it. Consequently, *nature* was as earthly as it was celestial, as human as divine, and even angelic. Nevertheless, during the twelfth and thirteenth centuries, thanks to the evolution of science informed by Greek and Arabic sources, the view became more terrestrial and anthropocentric: the various natural terrestrial realms of minerals, plants and animals took up more space in the explanation of the universe, while in anthropology and psychology, focused on the animation of the living, was developed the study of the rational soul and its faculties.

Once the assimilation of ancient thinking and that of the Arabic commentators was completed, the definitions inspired by theology, natural philosophy and medicine merged in the thirteenth century around the central notion of "force" as the explanatory foundation of the dynamics of nature, whether it be celestial (the *vis celestis* of Thomas Aquinas, which sets the universe in motion), intrinsic (the *vis insita* in every developing being), particular (the *virtutes* or properties that characterize compound bodies) or external (forces that cause unnatural motion).

Finally, the inquiry into nature at the turn of the thirteenth century also promoted the idea that man has an autonomous and superior ontological status in creation. As such, he has a special responsibility towards other creatures and a moral obligation to behave well and to try to find, through knowledge, the primordial resemblance with God. The study of his condition led to the development of a true anthropology, as exemplified by the treatise *De homine* (*ca*. 1242) by Albert the Great.[52]

[51] Weill-Parot (2013) deals with the question of the scholastic necessity for the rational explanation of nature.

[52] *Alberti magni Ordinis Fratrum Praedicatorum De homine*, ed. Anzulewicz, Söder 2008.

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As an epilogue, the spirit in which man's cultural – and agricultural! – role in nature was understood is well illustrated by the following extract from Albert the Great's Summa Theologiae commenting on an excerpt from Genesis, which underlines that it is man's duty to cultivate and to understand all that surrounds him. Here Albert considers the difference between the "divine science of philosophers",[53] which is the consideration or speculation typical for philosophers, and contrasts it to the theological consideration of the world, both of which are given by divine providence. Since Adam left paradise where harmony was total, man has been entrusted, through the "liberal arts", that is to say, theoretical education, and through work ("operation") and the experience of things, with the learning of "nature and the science of things":

Doc. IX: *Summa theologiae,* Pars II, tr. 14, qu. 89, m. 1, ed. Borgnet 1894–1895, 163–4a

Super illud enim GENESIS, I, 15: Ut operaretur et custodiret illum, distinguit GLOSSA, quae accipitur EX LIBRO VIII AUGUSTINI SUPER GENESIM AD LITTERAM. Duplex est **operatio** sive **cultura**.	Concerning the verse from Genesis I, 15: "[The Lord took man, and placed him in the Garden of Eden] so that he might labour and preserve it", the GLOSS, which takes up AUGUSTINE'S BOOK VIII ON GENESIS AD LITTERAM,[54] says that **work** or **culture** is to be understood in two ways.
Una est cum afflictione, quam Deus homini non indixit tunc cum esset in paradiso: quia DICIT DAMASCENUS, quod in paradiso non debuit nisi solatiosam vitam agere, et in jucunditate esse cum Deo.	On the one hand, it is work with much suffering, which God did not make known to man while he was in paradise, because, SAYS JOHN OF DAMASCUS, in paradise he had only the duty to live a pleasant life and to be joyful with God.
Alia **disciplinalis** est et liberalis, per quam scilicet per fructum opere **discitur** quid virtutis sit in radice. Et haec disciplina indicta est Adae, UT DICIT AUGUSTINUS: et hoc modo per intervalla temporum **discitur natura rerum per experimenta**. Ergo videtur, quod Adam per intervalla temporum **scientiam** accepit **rerum**	On the other hand, it is the work of **learning** and with the help of the liberal arts, by which we **learn** with effort, from the fruit, what virtue is found in the root. And this work of learning was assigned to Adam, AS AUGUSTINE SAYS, and it is in this way that, over time, we learn the nature of things by **experiencing** them. It thus seems that Adam, over time, acquired the **science** of **things.**

[53] It is probable that Albert borrowed the concept from the Baghdadi scholar Al-Ghazzâli (Algazel, 1058–1111), who wrote on Hellenistic Islamic philosophy, logic and religious philosophy. His works were translated by Gundisalvi in the third quarter of the twelfth century. See also Draelants 2019a.

[54] Augustinus, *De genesi ad litteram*, VIII.9, ed. *Patrologia latina*, vol. 34, 376–7. Augustine (354–450) discusses the existence of philosophy as wisdom. He refers to the acquisition of agriculture but also to all knowledge on nature, that is to say, human culture.

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