

4. The Logic of the Imagination. A Useful Fictionalism.

4.0. Introduction

In NE book III Chap. 3, Leibniz contests Locke's claim that in categorizing the world human minds move from representations of individuals to abstract general concepts. In Leibniz's view, human minds start rather with representing ideas of species and genus (NE 275; 296). Leibniz's claim is puzzling, for it seems to suggest that concepts of species are immediately available to human beings when dealing with the natural world. In this chapter, my aim is to show that in those passages, Leibniz does not have in mind concepts of species; he refers to human capacity to spontaneously track body-types and property-types. This tracking, I argue, is possible in virtue of image-types: interiorized rules for modelling and ordering perceptual presentings in the imagination apprehended by observation of bodies' behaviors through space and time. The imagination can interiorize those rules because it is sensitive to qualitative and quantitative similarities of bodies ordered according to space-time relations.

Section 4.1 puts Leibniz's theory of imagination in the context both of his denial of Descartes' transparency thesis, as discussed in Chap. 3, and of his work in geometry. Section 4.2. spells out the issue concerning categorization of natural kinds in a more precise manner. Conceptual knowledge concerns essences. If sense-perceptions present to human minds particular existing beings, how can they conceive of abstract possible essences? To solve this problem, Leibniz introduces the work of the imagination. Section 4.3. shows that the imagination is not an anarchic faculty; it is a faculty of rules for organizing phenomena based on their qualitative and quantitative similarities as they appear in space and time. Section 4.4. and 4.5. analyze the contribution of the imagination in dealing with perceptual presentings as discussed in two letters: *On what is Independent from Senses and Matter* (henceforth ISM) and *On the Elements of Geometry of the Duke of Burgundy* (EGDB). Section 4.6. attempts a detailed explanation of why we need image-types, whilst section 4.7. gives a full account of what image-types are. In section 4.8., I conclude with some general remarks.

4.1. Imagination and Geometry.

In chapter 3, we have seen that Leibniz's denial of pure intellection leads him to acknowledge the importance of two different types of expressions for reasoning: image-types and concept-types. The

denial of the transparency thesis, nonetheless, occurs contemporarily to Leibniz's astonishing achievements in the field of geometry through the shaping of its *analysis situs*.¹ In this field, similarity is a fundamental relation among figures in geometry, resulting from an act of co-perception in *imagination*. The human mind's natural appeal to the imaginative faculty in this field is used by him as a model to shape his theory of image-types. Image-types are rules to form expressions which maintain a relation of analogy to the things expressed. Specifically, Leibniz's definition of the categorization work in the natural sciences as a "mathesis generalis" or a "mixed mathematics" expresses Leibniz's ideas that the mechanism governing the imagination in fields like geometry and algebra is a model for understanding how the imagination underpins and "prepares" the expressions of the natural world through concepts.²

In the same year of *Analysis situs*, moreover, Leibniz develops his project of a universal characteristic. The constitutive dependence of the human mind on the senses and the imagination in processes of knowledge leads Leibniz to theorize a reduction of human reasoning to an algebra of concepts based on a universal characteristic, a formal language which should enable human minds to progress in the sciences through an ordering of concepts' definitions via formal characters.³ The constant reference to the work of the imagination in natural kinds' categorization, in the context of its project of a universal characteristic, and of its work in geometry entangles all these apparently unrelated topics. To understand the role imagination plays in structuring epistemic processes, I argue that, within Leibniz's cognitive theory, the imagination is a faculty of rules, responsive to some constraints innately structuring the mind. These constraints are what Leibniz calls innate principles and ideas.

The contemporaneity of his work in geometry and his criticism of Descartes' transparency thesis makes it hard to tell whether it is the latter issue that makes Leibniz realize the importance of the imagination for cognitive processes, or, in turn, it is the former that is the reason for Leibniz's rejection of Descartes' transparency thesis. One link is however evident: the denial of Descartes'

¹ According to the most extensive contribution to the field (De Risi 2007), Leibniz's definition of space and time as an ordering relation appears in 1677, the same year of QSI, where the relation of expression assumes a technical meaning. Moreover, an important text analyzed in section 4.2., is dated 1683, only one year before the MKTI.

² In describing his project of a universal characteristic, a language which allows reasoning as if we were using an arithmetical calculus (A VI 4 A 719), Leibniz writes that only few tried to advance in other sciences relying on the example given by imagination in abstract mathematics ("Equidem fuere quanquam pauci, qui quod princeps in logica fecit Aristoteles, in aliis quoque scientiis ab imaginatione abstractis mathematicorum exemplo tentarent." A VI 4 A 719)

³ The project of a universal characteristic is part of a wider project of Leibniz, the "general science", which comprehends two further parts: the encyclopedic work of gathering and ordering each science and its achievements; the establishment of an alphabet of human cognition, consisting in a complete list of fundamental terms and their definitions ordered in a chain which shows the connections among terms. Many papers edited in VI 4 A, such as *Elements of reason* (Elementa rationis 1686) highlights this project.

thesis commits Leibniz to find a different explanation for the directedness of mental acts. His reflection on the role of imagination in geometry, coupled with the role played by space and time in this discipline, must have influenced his answer to the question: what is it in virtue of which that our mental acts refer to things or how do they become *expressions* of things.⁴

As seen in 3.4., to answer this question Leibniz introduces a further distinction between natural and arbitrary expressions-types. Images are natural expression-types because they resemble their object, while words used to define concepts are arbitrary expressions. I want to demonstrate here that images can be confused expressions of things' essences and must be acquired by the mind before concepts, for they serve as a basis for concept acquisition. Concepts are a different type of expressions that depends on the use of signs which stay in a grammatically and semantically ruled connection to form definitions. Concepts coincide to what Leibniz calls "distinct notions". Definitions are the mark of distinct notions and express the act of thinking of an essence's possibility.

I argue that to explain how, according to Leibniz, we can infer essences from what is primarily available to us, beings manifest in the act of perceiving, we need to postulate image-types. In other words, I want to delineate Leibniz's theory of how human finite minds have in them the resources for conceiving the ideal world of essences starting from the real world of the existents.⁵

4.2. Being and Essence.

The distinction between beings and essences is a technical one in Leibniz's writings. Being is what is concrete and can be either a possible existent or something actually existent.⁶ Bodies, as extended

⁴ De Risi (2007) dedicates a chapter to Leibniz's "Phenomenology" (De Risi, 2007: 405), where he denies that there is a faculty of imagination independent from the intellect. In 4.4., I argue that there are textual evidences for imagination as an independent faculty. The imagination is independent from the intellect, this latter understood as the faculty of reasoning based on clear and distinct concepts, because it provides the mind with image-types, which are not mere results of sense-perceptions, but are not conceptual yet.

⁵ In NE 301, Leibniz contrasts the historical world with the ideal world human beings conceived throughout concepts: "[...] that [i.e. the very form or possibility of thoughts] is what we are concerned with when we separate off the ideal world from the existent world. The real existence of beings which are not necessary is a matter of fact or of history, while the knowledge of possibilities and necessities (the necessary being that whose opposite is not possible) is what makes up the demonstrative sciences."

⁶ Leibniz relates the concept of being to possibility. Within Leibniz's modal theory, possible refers to what is conceivable without contradiction and it is, therefore, distinct from what exists insofar as existent beings cannot fail to be possible, whilst possible beings can fail to exist. GP III 573-4: "possible is everything that is perfectly conceivable and that, consequently, has an essence, an idea: without considering whether other things allow it to become existent."; L 363/A VI 4 B 1502: "A being is that whose concept involves something positive or that which can be conceived by us provided what we conceive is possible and involves no contradiction. We know this [...] in a shorter way, if the thing actually exists, since what exists must certainly be a being or be possible"; A VI 4 A 931: "Every existent is possible".

existent beings, are the first objects of human finite minds' perceptual experiences, insofar as minds are in an *organic* body and have full-fledged functioning organs.⁷ As seen in chapter 2, a perceiver's cognitive processes are directed by memory and attention, which in turn are firstly activated by changes in the distinguishedness of the perceptual activity. When organs are aptly affected by objects, a unification of minute perceptions corresponds to these bodily affections. The result is a distinguished perception of secondary qualities that is represented in the imagination as an image whose advantage is to be cognitively available even when the object no longer affects the sense-organs.⁸ The copercception of bodies, i.e. the simultaneous apprehension of coexistents, makes the mind apprehend relations among bodies, like situation in space at different time. In this way, we represent objects *as in* space and time.⁹ As we will see soon, this representation is ideal.¹⁰

Essences, however, cannot be known via perceptions, for they have neither extension, nor parts. As I understand the term "essence" in Leibniz's text, essence is the reason why many qualities collectively form *one* notion. Essences can therefore be expressed through definitions.¹¹ Human beings express an essence by considering some qualities as constitutive of *one* general abstract concept. We will return on this point when we will analyze Leibniz's theory of concept. The important aspect is that for Leibniz an essence cannot be a being. In *De abstracto et concreto* (1688, A VI 4 987-94), Leibniz justifies the distinction arguing that if an essence was a being, then we would be entitled to an infinite regress. As any being has an essence, the being of the essence will require an essence too and so *ad infinitum*.¹²

To give an intuitive example of the distinction being-essence, consider that Peter, as an existent particular being, is known via perception. For in my perceptual environment I can distinguish Peter

⁷ A VI 4 A 561: "Ante omnia Menti occurrere videtur materia conceptus alicujus positivi sive realitas vel essentia; in quo conveniunt omnia quaecunque a nobis percipiuntur. Et ideo aliquid vocamus Ens vel Rem sive Subjectum, postea concipimus Substantiam seu Subjectum ultimum, deinde videtur a nobis concipi praesentia, seu quod nunc est quanquam quicquid Menti observatur revera nunc esse credituri eramus, nisi experimentis nudas apparentias imaginationes et somnia a phaenomenis realibus distinguere didicissemus."

⁸ A VI 4 B 1394: "An image is the continuation of a passion in the organ, may the action of the object have stopped. Imagination is the perception of the image." (A VI 4 1394).

⁹ Leibniz defines space and time as "space is the order of the coexistents, time is the order of changes" (A VI 4 A 632).

¹⁰ A VI 4 A 629: "time is an imaginary being, such as space, qualities, and many others."

¹¹ "Essence" is usually defined by Leibniz as what is "thinkable" (*cogitabiles*). As we will see later, however, an essence can be represented throughout the imagination insofar as signs are used to represent the definitional marks of the essence. In this way we represent something properly immaterial *as if* it had parts through words which stay in an ordered relation. On the impossibility of perceiving what does not have parts, see Bolton (2006). Notice, moreover, that the distinction "being" and "essence" also is present in Hobbes, as for instance he points against Descartes in the fourteenth objection of the third set (CSM 136).

¹² A VI 4 A 994: "An Essentia est Ens? Ita sane si philosophi scholae consequenter loqui volunt. Ergo Essentia habebit etiam essentiam, et sic in infinitum, inutili reciprocatione." The same argument is given by Lowe (2008).

from Mary and from the desk and chair and all other things present here because those things affect the sense-organs in a particular distinctive way and produce a different affection which is expressed by a different image. But Peter expresses an essence, BEING A MAN. The essence BEING A MAN is grasped when a rational mind considers together some properties which inhere in this essence, BEING AN ANIMAL and BEING RATIONAL and consider those properties *taken together* as non-contradictory and therefore possible. The following passage of Leibniz's re-elaboration of his writing "Nova methodus" makes this point clear. (Please notice that this passage is not dated in 1667, but rather 1708¹³.)

Terms are either simple or composite. Simple terms are those which cannot be made clear by more familiar terms, because they are given immediately to sense, that is they are themselves sensible qualities. That which has sensible qualities, or is perceptible, is called a *being*. So, with respect to us it can be said that the essence of a thing is for us the distinct *conceptibility* (or imaginability) of that thing, and the existence the distinct perceptibility (or sensibility) of it. Indeed, the compound of the qualities assumed simultaneously, that is *conceptibility*, constitutes the essence of a thing; perceptibility proves its existence (as evidently it is not a thing's fault that it is not actually sensed).

For from co-imaginability or coessentiality there arises *comparison*, between same and different, similar, dissimilar and opposite, genus and species, universal and singular. From co-sensibility or coexistence there arises *connection*, between the whole and the part, order, one and many; necessary, contingency, connection, and cause, etc. From this grows metaphysics in general, to which the doctrine of quantity and quality in their widest sense can be referred in *logistics* and the art of *combinations*, respectively. The former deals with proposition and their calculus (and hence with the one and the many, the whole and its parts), the latter with forms (or similarity and orders of determination).¹⁴

¹³ 1667 is the year of publication of the *Nova Methodus*; as we know from a letter to Placcius from June 25/July 5 1695 (A II 3 50) and a letter to Kettwig (June-October 1696), Leibniz was working to revise his text with the aim of publishing an updated version of it. A copy of his book with added pages of notes has been found in his library. According to the Academy-Edition, there has been three main revisions during the year 1695-1708, and the text reported must be a revision made during 1708. The revisions have been published as footnotes of the 1667 edition in A VI 1. The revisions have been only partially translated in Loemker (1969).

¹⁴ A VI I, 285; trans. mine; I decided to modify Loemker partial translation in L 91 because it oversees the distinction of three kinds of conceivability. I would like to thank you to Dr. Herma Kliege-Biller and PD Dr. Stephan Meier-Oeser, and Dr. Lloyd Strickland for discussing it with me.

The passage is long and complex, but it clearly states a distinction between terms, beings, and essences. As Di Bella (2004) suggests, Leibniz's use of "term" must be understood as middle way between a concept and its expression through words. I think the suggestion captures Leibniz's intent to distinguish between ambiguous uses of words: their use in everyday language, where words are mostly used to refer to external objects; and the logical use of words, where words are signs for concepts and their *intensional* relations. Terms, as used in the passage, correspond first to clear and distinct notions, for when we decompose them, we arrive at some further terms to which sensible qualities correspond; these qualities, however, cannot be made clear and distinct through a conceptual reduction to other terms, and thus are clear and confused.¹⁵ Those things which bear qualities are *beings*. These can be considered under the attribute of essence or of existence. At this level, Leibniz distinguishes three different kinds of conceivability.

Even if the terminology may sound strange, the point Leibniz is trying to make is that there are three different kinds of mental acts involved in human cognitive processes: perceptibility, imaginability and conceptibility. Perceptibility is strictly related to how beings are presented in experience through the ways they affect the senses; imaginability is the capacity of imagining how things *can* be; conceptibility is the proper act of defining an essence's possibility: a concept. Interestingly, the second and the third acts both concern the essences of things, whilst only the first one concerns their existence. The peculiarity of perception, therefore, is to make us know *confusedly* the existence of things for we represent them *as* in space and time.¹⁶

Conceptibilitas concerns essences insofar as it is the act according to which we conceive the qualities proper to an essence *together*. This act allows minds to form concept-types and express them through definitions. We should not forget Leibniz's assumption, indeed: Concepts are not purely intellectual, but must be expressed through an imaginable or perceptible system of signs ruled by syntax and semantics: a language.¹⁷

¹⁵ In the sense of MKTI (A VI 4 A 590).

¹⁶ In *De Affectibus*, Leibniz's writes that "Omnis perceptio sensio, sententia est affectio mentis quae involvit objecti existentiam." (A VI 4 1434).

¹⁷ The evidence of why signs must stay in a ruled connection to be expressions of concepts can be deduced from Leibniz's notion of expression in QSI (A VI 4 1371/L 207). Less evident at this point of my analysis can result the reason why these connections must be *syntactical* and *semantical*. A partial answer to this question can be found in Leibniz's assumption that expressions must be fixed: stable in the sense of representing the same for us and for others (*De mente* A VI 3 461/DSR 5). This stability is based on semantic and syntactic rules structuring language which grounds habitual relations between concepts and their linguistic expressions. The reason for this, however, will emerge in chapter 6.

The rest of the passage clarifies a further capacity proper to rational beings: conceiving of things *simultaneously* in order to perform a second act of conceiving which consists in the apprehension of relations among beings taken as expressing an essence or taken as expressing existence. For instance, Peter and Mary are similar *qua* HUMAN-BEING, but both are dissimilar from CHAIR or a DESK. Nonetheless all these beings are similar *qua* BEINGS. However, before grasping a distinct comparison between beings apprehended as instances of general concepts, we can compare existents on the bases of some extrinsic manifestations: the shape of their bodies, some qualities they manifest, the spatio-temporal relations characterizing them. These relations are based on an act of coperceptibility of coexistents which grounds the construction of phenomena based on part-whole relations, causal connections, and modality, as the passage claims.

The rest of this chapter inquiries into the relation between coperceptibility and coimaginability. The important aspect to notice is that all these relations are first non-conceptual (i.e. they are not yet distinct notions of which we can give a definition). They can be grasped clearly and confusedly through co-imaginability and co-perceptibility of things.

Coperceptibility, i.e. the act of perceiving coexistents simultaneously, allows minds to conceive two different modes of beings: quality and quantity, which, as the passage goes, are the basis for the growing of metaphysics. Moreover, as we will see soon, coperceptibility, as the act by which minds apprehend ordering relations among beings, enables them to form representations of space and time and, therefore, to imagine beings *as* they occupy a position *in* space and *in* time. Space and time are for Leibniz ideal ordering relations, and not things existing in the world(s). For they arise from relations among beings, they are *entitates imaginarium*. I want to argue that space and time, together with quality and quantity functions as constraints for the (co)imaginability of things. The question I address is therefore: how do finite embodied minds idealize the world as made up of coexisting *beings*? How do they move from perceiving *beings* to conceiving *essences*?

My working hypothesis is that the function of the imagination is to produce a first ordering between beings based on similarity among beings and their parts. The similarity among beings and their parts serves as basis to acquire image-types. Image-types consist in an interiorized capacity to track body-types and property-types, which allows human beings to expect and predict bodies' behaviors in nature. *Conceptibilitas* introduces distinctness in essences represented only clearly and confusedly by expressions constructed by image-types. Concepts, therefore, do not deal straightforward with individuals; they introduce distinctness in the ordering work of the imagination by making explicit

properties which characterize body-type which are already subject to a process of abstraction due to image-types. What human minds express with definitions are abstract essences as MAN, TREE, DOG as they are confusedly cognized via image-types. Concepts are formed to introduce intensional distinctions within image-types; they do not serve primarily to introduce further extensional divisions among beings. Image-types as described in this chapter cannot account for an intensional analysis of concepts, although some other forms of diagrams (lines or circles) can and are indeed used by Leibniz as figurative representations of conceptual inclusions.

The question is, therefore, how image-type expressions serve as a grounding for the conceptibility of essences. To answer this question, we must understand which mechanisms govern the imagination.

4.3. The Logic of Imagination.

The imagination is not an anarchic faculty for Leibniz. By anarchic, I mean that it is not a faculty which produces “monsters” by combining perceptual presentings arbitrarily.¹⁸ The imagination is first and foremost deputed to track regularities and similarities in perceptual presentings and to express those regularities through an ideal order of the perceptual presentings. Hence, it does not operate independently from some principles of order which are for Leibniz innate. Through this ordering work, the imagination essentially leads the art of discovery by producing expression-types which are naturally related to the *exprimenda*. As Leibniz states in QSI (analyzed in 3.4.), images are natural because they are based on similarity. We need to direct our attention to the question of how the imagination detects similarities.

The topic of a “logic of imagination” emerges very early within Leibniz’s logical investigation. The paper “*Idea libri cui titulus erit Elementa Nova Matheos Universalis*” (1683?) defines “mathesis universalis” as a science whose scope is to hand down a method of inquiring into those “things” which are subject to imagination. It is therefore said to be a “logic of imagination” (A VI 4 513). In another paper contemporary to this, Leibniz defines “mathesis universalis” as a “science of imaginary things” (A VI 4 509: *De arte combinatoria usu in scientia generalis*) which is distinct both from logic, a

¹⁸ This is also evident by Leibniz’s use of the term “fiction”: it is not a synonymous of “made up” as the result of a combination of parts to form notions of non-existing objects, as in the case of Descartes’ fictitious ideas. Fiction is the act of “*fingerere*”, to imagine, an act performed in compliance to some *modes of conceiving*. It is true that what we conceive in the act of “*fingerere*” is something that does not exist actually. We will return to the meaning of fiction later. It is worth noting that Leibniz’s theory of imagination allows him to positively assume arguments based on fictional objects or propositions, such in the case of jurisprudential fictions or mathematics.

general science, and from metaphysics, “the science of intellectual things”.¹⁹ As the text goes, those things are imaginary as far as they are modes of *matter*²⁰ and have parts; they are therefore subject to quantity and quality (A VI 4 514). Leibniz makes straight that what is purely intelligible, i.e. the metaphysical notions of the intellect, is not subject matter of the imagination.²¹ The external reality, as far as it is material, is subject to the logic of imagination. In Leibniz’s eyes, geometry is a special branch of the *mathesis generalis*, whose scopes are wider, for it concerns the apprehension of the natural existing world. But why does Leibniz think that, in processing perceptual presentings, human minds appeal to the imagination and to its constraints? To this question there is both a *natural* and a *theoretical* explanation. The natural explanation is that for minds that are embodied, attention and memory, necessary for any cognitive processes, are first and foremost controlled by sense-perceptual modifications. The imagination plays a central role in directing those two faculties in processing perceptual presentings, as we will see soon. The theoretical explanation is that through the imagination, as geometry teaches us, we learn to conceive *perspectives* or to conceive of *one thing as proportionally related to another*;²² In other words, we learn to construct expressions’ relations between *exprimens* and *exprimendum*. Let’s consider more accurately the work of the imagination.

The imagination in general is directed towards two [notions]: quality and quantity or magnitude and form, according to which things are said to be similar or dissimilar, equal or unequal. It is also true that the consideration of similarities, and of equalities too, belongs to a general mathematization; it follows that special mathematization, such as geometry, always investigates into the similarities of figures. Similar are those things

¹⁹ In *Elementa rationis* (1686, A VI 4 A 722), Leibniz claims that imagination in metaphysics does not proceed as beautifully as when it deals with objects which are subject to it, as in the case of mathematics. However, a long passage argues for the possibility to use an algebra-like calculus to analyze metaphysical notions. One reason brought by Leibniz is the implicit expressions of intellectual notions, those which are subject to the intellect, through notions which are subject to the imagination, as similarity and dissimilarity, beings, substance, unity. “Scientia enim de simili et dissimili in universum deque formulis et signorum combinatione, non minus quam illa vulgo recepta de aequali et inaequali per demonstrationes tradi potest; et in universum tam late fusa est, ut non per Mathesis tantum, et subjectas imaginationis artes regnet (in quibus ne satis quidem animadversa est hactenus, etsi ipsa Algebra omnem suam ab ea praeaesentia mutuetur), sed et viam praebeat, qua caetera sensibilibus exprimi possint quae ab imaginationis jurisdictione exempta videntur, quemadmodum ex nostris patebit.” (A VI 4 A 723).

²⁰ I prefer here to say modes of matter, rather than extension because, as we will see below, there is a difference for Leibniz: matter *qua* existent is always discretely determined to the least of its parts; extension, as a continuum, uniform matter, cannot exist in reality. It is therefore a distinct notion of the imagination. I will discuss this in the next section.

²¹ A VI 4 514. We should however interpret this claim more carefully. In the letter ISM, Leibniz claims that we conceive of an intelligible notion “as it were the object of the intellect alone” (Strickland 240); but it is not, for we need expressions as signs or characters to think of them. Don’t forget that for Leibniz minds have a spontaneous tendency to represent throughout the imagination also what is not subject to it.

²² As De Risi (2007) shows, the concept of space and of geometry as the science of the projection of figures is developed during the renaissance, thanks to the work of author like Patrizi. However, geometry is for renaissance authors a science of figures in space, whereas for Leibniz it becomes a science of order of situations. See also Mugnai (2010).

which cannot be distinguished per se one by one (*singulatim*); qualities or forms are what distinguish things per se. Similar things are nonetheless distinguished in an act of comparison, which consists both in the coperceptibility (*copraesentia*) of the things to be compared, and in the coperceptibility of a same third with both. (A VI 4 513)

The imagination is sensitive to two modes of material beings: quality, viz. shape, and quantity, viz. size (*magnitudines*). Bear in mind that these two notions are the same ones invoked in ISM as notions used by the imagination to organize perceptual presentings.²³ After having delineated that the study (*considerationem*) of similarities and equalities is proper to both general mathematization and particular mathematics, such as geometry, Leibniz defines as “similar” those things that cannot be distinguished per se when taken *one by one* (*singulatim*), but only when they are put in a relation of co-presence with other things. This comparison founds a first distinction through *shape and size*. The idea seems to be the following. Shape per se can distinguish two bodies, as in the case of a sphere and a cube. When two objects have the same shape, two spheres for instance, we can distinguish them in an act of co-presentation. In this way we apprehend that they have similar shape but differ in size, for instance. Note that this “compraesentia” corresponds to what Leibniz calls “comperceptibilitas” in the passage of *Nova Methodus* quoted above.

In the rest of the paper, Leibniz analyzes cases when shape and size cannot help in distinguishing two objects, and therefore we need to appeal to other criteria. One case is two spheres of the same form and size, but one made of gold and the other made of silver. In this case, they differ because of some property of matter. When even properties of matter cannot help, such in the case of two perfect spheres made of gold, an epistemic criterion to discern both things is to put them in a space-time relation. In this case things are distinguished “solo numero”. Leibniz specifies that the question of whether two perfectly identical objects can exist is a question which concerns metaphysics. He seems to not deny that two things can appear perfectly identical to us. The fact that they cannot occupy the same space at the same time is a valid *epistemic* criterion to consider them similar, but nevertheless not identical.²⁴

²³ In ISM Leibniz uses “numbers” instead of “quantity” or “magnitude”, but in a text edited in De Risi (2007: 622; *On the Universality of Number, and on Time* [LH XXXV 1, 6, Bl. 1-4]) he claims that magnitude can be measured in terms of numbers. Here however, the quantity Leibniz refers to is the relations of proportion and distance arose by the coperception of perceptual presentings in space.

²⁴ A VI 4 A 514: “Those things differ according to number which cannot be distinguished by mean of a comparison among them, but they must be referred to external things in space and time; if it possible to have things in nature which differ by number alone, this evidently only because they are not actually one, but many, must not be decided here, for it belongs to metaphysics.”

The way in which the examples are organized suggests an attempt to *strip* the fundamental relations which allow the tracking of bodies and their changes. If similarity of qualities and quantities is the most evident, by stripping away differences, the only phenomenological criterion available is the situation of bodies in two different positions in space at the same time.

To sum up, the text analyzes the way in which things are compared in the imagination. The condition of possibility for the comparison is the human capacity to perceive coexistents *simultaneously*. The coperceptibility of things allows the apprehension of quality and quantity, which allows a first determination of bodies. When we abstract away from those constraints, what is evident is their relations in space and time. Therefore, we imagine things of different shape and size as occupying a determinate situation in space; as occupying different position in time. We imagine bodies as bearing space-time relations.²⁵ These modes of conceiving objects structure the work of the imagination in the act of perceiving things simultaneously.

The text, however, deals with already given objects and it is not explicit on the relation between sense-perceptions and imagination. This relation is discussed in ISM.

4.4. Imagination in ISM: The Coherence of the Perceived Phenomena.

Leibniz systematically addresses the question of the distinction between imagination and sense-perception in a famous letter to Sophie Charlotte: ISM.

In ISM, Leibniz distinguishes among sensible, imaginable, and intellectual notions. Sensible are those notions which originate in the senses; imaginable are notions subject to the imagination; intellectual are those notions which represent “being as it were the object of the intellect alone” (Strickland 239), such as the notion of “myself”. Intellectual notions are metaphysical notions and, as Leibniz insists, although the fact that these notions are not subject to the imagination, we need signs or characters to think of them.²⁶

The view presented here is subversive in so far as Leibniz explicitly presents “perceptibility” as a function of the imagination. The perceptibility described in the *Nova Methodus* as distinct from

²⁵ A VI 4 A 893: “Every relation among things is expressed by virtue of some relation among the situations of bodies.”

²⁶ See Fn. 2 and 22. In a letter to an unknown correspondent (October 1707, forthcoming in II 5), Leibniz writes: “The true philosophy, the one which is raised (s'élevant) beyond the senses and the imagination, searches for the origins of phenomena in the intellectual regions.”

imaginability, hence, is simply another face of the same faculty: when it looks at the things *qua* existent, imagination processes some kinds of relations; when imagination turns towards the side of the essences, it supports the grasping of relations among notions. The products of the *imaginatio*, when directed to sense-perception, are *phenomena*. This second function of the imagination is what allows the mind to interiorize what I call image-types. Image-types, I argue, is the term we need to introduce to explain the passage from perceiving existent beings to confusedly conceive of essences.

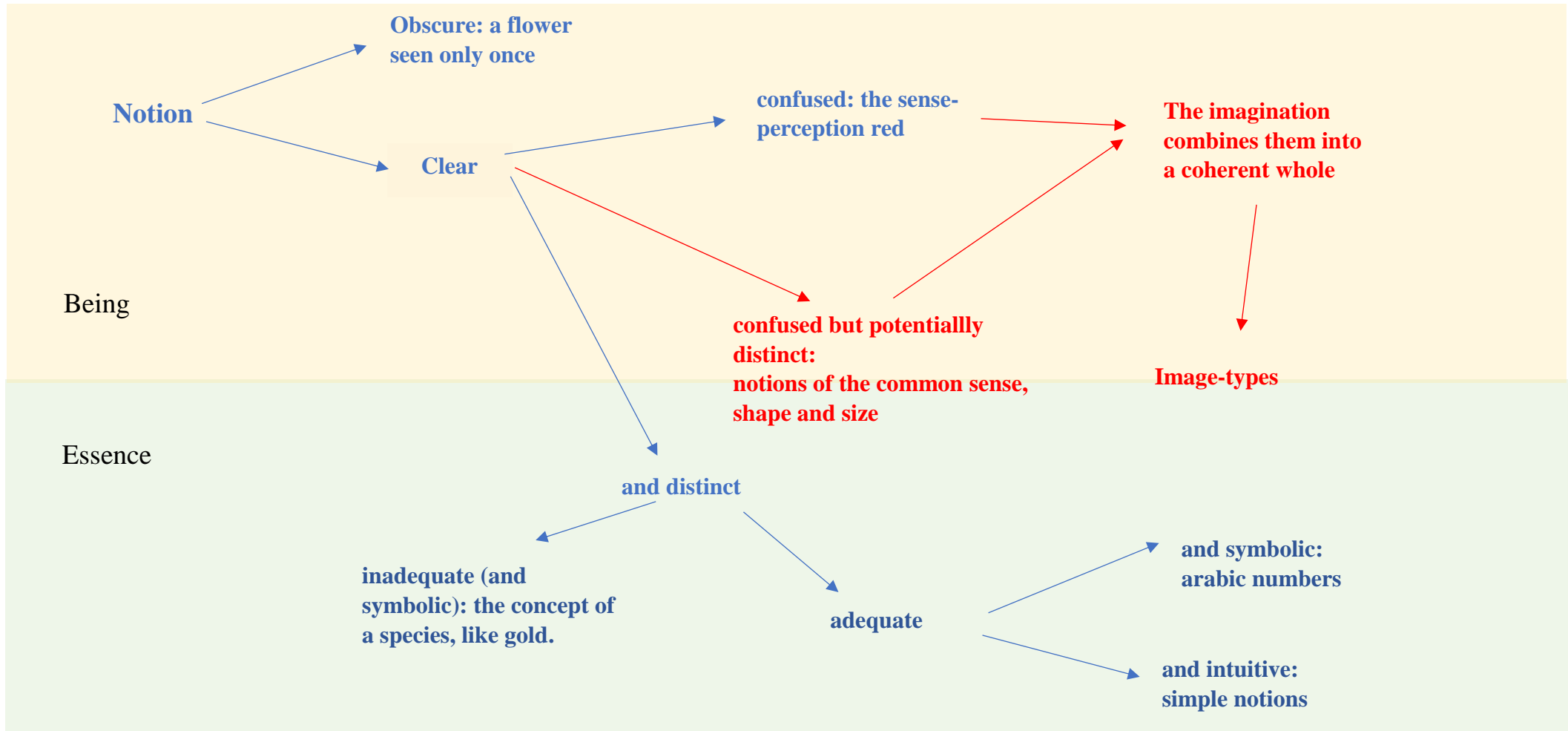
The work of the imagination, as presented in the letter, is not simply of comparing bodies copresent in space and time; its task is to abstract and interiorize body-types and property-types based on comparison of bodies and their variation in space and time. I describe this process as an interiorization because image-types cannot be explicitly represented in the mind. They are unconscious ways of tracking coherence of phenomena and predicting modes phenomena *can* assume in the actual or other possible world *when considered as types* of bodies or properties.

Let's analyze the distinction between the three kinds of notions more closely in order to address the work of the imagination. Leibniz's begins the letter with stressing both the importance and limits of the senses, which we use as a blind person uses the stick. If each sense can provide notions related to each sense, like colors, tastes, smells, etc.; these qualities are clear but confused. The reason for the confusedness of those qualities lies in their own nature: we can recognize red when we encounter it if and only if a subject with full-fledged organs senses "red". A blind person cannot recognize red. By contrast, distinct notions are distinct insofar as they allow to recognize the things expressed by virtue of the definitional marks that compose the notion. If a blind person will never recognize red, she can define a red tomato by virtue of other marks: its shape²⁷, its being eatable, its being a vegetable, and so on. Until here nothing new in comparison with MKVI, except the fact that Leibniz introduces what seems to be a further degree between clear and confused notions of sense-perceptions and clear and distinct notions (See the Figure on p. 13). This further level is what I call image-types and they consists in a mediatory work carried on by the imagination.

²⁷ Shape may be known by other senses, like touch.

Meditations on Knowledge, Truths and Ideas (1684)

Letter on What is Independent from Senses and Matter (1702)



This remark is important because it underlines that at this level we are not dealing with conceptual knowledge: numbers and shapes as *perceived* by the common sense are particular manifestations of numbers and shapes, not concept-types of expressions. The imagination deals with presentations of particular shapes, a material that only the senses can provide and which is, like the notions of secondary qualities, clear and confused: it corresponds to a *perception* of a shape. (Suppose you are presented with a 5-cube, a cube in a 5-dimensional space; you see a shape, but you have no clear and distinct notion of that figure –I am assuming you are not an expert mathematician–, but you *see* a determinate shape.)

After this clarification, Leibniz introduces the work of the imagination:

Therefore, as our soul compares (for example) the numbers and shapes that exist in colors with the numbers and shapes that are found by touching, it must be the case that there is an *internal sense* in which the perceptions of these different external senses are reunited. This is what we call the *imagination*, which includes both the notions of the individual senses, which are clear but confused, and the notions of the common sense, which are clear and distinct. And these clear and distinct ideas which are subject to the imagination are the objects of the mathematical sciences, namely, of arithmetic and geometry, which are pure mathematical sciences, and of the application of these sciences to nature, which makes mixed mathematics. (Strickland 239)

Let's make the contribution of the senses clear. In chapter 2, I have argued for a direct proportionality between organic complexity and cognitive complexity. The organic body, as far as it is endowed with functioning full-fledged organs, is more perfect than a non-organic body. This perfection consists in a *unification* of the impressions of the environment on a perceptive subject. A more complex organic being endowed with nerves and brain is capable of a greater unification of the impressions in the brain than, for instance, an ameba. This unification produces an increase of the effectiveness of the impressions to which a distinguished perception corresponds. This theory of Leibniz, as seen, is grounded on the thesis that sensitive rational and non-rational souls are omniscient as far as any single change in matter bears an influence on their organs, although the soul is not capable of expressing it *distinguishedly*. The sensitive soul has minute perceptions of all those changes, but it forms *distinguished perceptions* of qualities of objects which impress the senses aptly (under the right light or air conditions, within a certain distance in space and time, etc.). Only objects which affects the organs aptly indirectly cause an involuntary and spontaneous unification of the minute perceptual activity of the soul. This unification makes minute perceptions more intense and heightened, and, in

so doing, produces a distinguished perception: a perception which stands out from the crowd and makes itself “visible”, “audible”, “testable”, “touchable”, or “smellable”. The external world appears to us *qua* merely *sensible*: a multitude of secondary qualities *simultaneously* sensed. In this process, there is a loss of information, as Leibniz’s example of the color green (NE 53) is explicit about this: the green sensed is composed by innumerable tiny yellow and blue parts; it is a lack of power in sight which makes “visible” a homogeneous color green. The physical limits of the sense-organs represent a first constraint on what can become *imaginable* by the mind.

Leibniz introduces a complication here: the common sense. The common sense is a sixth sense which detects information that can be received by different senses, i.e. primary qualities such as shape: we can apprehend shape by sight or touch. These notions are therefore proper of the common sense, but are only potentially clear and distinct, as explained.

At this level, Leibniz explains that what is simultaneously sensed by the sense-organs in isolation or together (by the common sense) is processed by a further *unification* in another faculty, the imagination. The necessity of the imagination is justified on the observation that despite the multitude of perceptual presentings, we perceive unities, like one body. The contribution of the imagination is the formation of a whole: a coherent expression of *one* body constructed by unifying what comes from each sense, i.e. tastes, colors, sounds, etc., and what comes from the common sense, i.e. shapes and numbers. Via the work of the imagination the mind conceives a coherent expression of the phenomenon perceived: we *perceive the image of* a red round tomato as different from *the image of* a red round apple, or a square brown table. In other words, we *coherently* organize the information provided by the senses into a coherent whole: an *image*.

The imagination is first presented as a faculty of synthesis: it unifies secondary qualities and primary qualities into a coherent whole: an image. *After this*, the imagination works on images and produces an *abstraction* of secondary and primary qualities’ image-*types* by comparing image-*types* as they change in space and time.

To be more precise, the synthetic function of the imagination consists in a two-step process. The first step is to unify the sense-perceptions in a coherent whole. At this level we reproduce an image of the external world. However, the second step consists in a *process* of comparing and abstracting from the images produced in the imagination. The result of this latter process is an image-type. In other words, to keep the difference between the first and the second step, and, more importantly, to understand the cognitive relevance of the second step, we need to introduce what I call image-types.

Image-types are interiorized ways of organizing and comparing phenomena in compliance with the constraints of the imagination: part-whole relations, comparison, similarities of quality and quantity, and spatio-temporal *rules* of ordering them. They are not simple images because, as I will argue more extensively in the next two sections, they are more complex *cognita* which retain bits of information about how body-types or property-types can change preserving their *type-identity*. For instance, the image-type of the human body, i.e. that particular kind of body only human beings have, retain information about how parts are related and how they behave. Image-types cannot be directly conceived neither; they are indirectly conceived through abstract images which as such cannot exist in the real world. They are not mere images of external particular things. Something *clear* is added to sense-perceptions through the work of the imagination in processing perceptual presentings according to some rules.

Image-types are not the result of a simple comparison in a comperceptibility act. They are the results of a more complex act of *imaginability* which consists in the detection of regularities in variations of bodies tracked *because* of similarity constraints, like quality, quantity, observed over spatio-temporal variations. A full account of the work of the imagination in dealing with the created world can be find in EGDB.

4.5. EGDB: The Creation of the Ideal World.

The letter EGDB discusses an error found in the Duke of Burgundy's *Elements of Geometry* published on "le journal des sçavans" on September 1705. To capture the epistemological and cognitive role of the imagination as delineated in the letter, let's spell out what is this error made by the Duke.

The Duke provides an argument for the existence of atoms by analyzing the mathematical *continuum* made up of unities. Leibniz reports to Sophie this argument which starts with the premise that existence is proper only of unity, not of multitudes: a flock of sheep or an army exist only insofar as the unities they are made of exist. So, only unities exist. Arithmetic proves this point, for there cannot be numbers if there is no unity. If this is rightly conceived, argues the Duke, we need to conclude that only indivisible unities of matter exist. To prove his point, he brings a thought experiment:

Is this cubic foot of matter a single substance, or is it several of them? You cannot say that it is a single substance, for quite simply (in that case) you could not divide it in two (if the substance was not in the body before the division, you would give rise to new substances at every moment). If you say that it is several substances, because there are

several of them in it, this number, whatever it is, is composed of unities. If there are several existing substances, it must be the case that there is one of them, and this one cannot be two of them. Therefore matter is composed of indivisible substances. Here is our reason (adds this insightful prince) reduced to strange extremes. Geometry shows us the divisibility of matter to infinity, and we find at the same time that it is composed of indivisibles. (*Elemens de Geometrie de Monseigneur le duc de Bourgogne* quoted by Leibniz in Strickland 334)

The question is a metaphysical thorny one. People acquainted with the metaphysics of Leibniz can notice that the argument is strikingly similar to the one given by him in favor of “metaphysical unities”.¹ He is rather disturbed by the paradox the Duke drawn from geometry: the labyrinth of the *continuum*, the same paradox which afflicted Leibniz and which he resolved by noticing that points do not compose geometrical figures, but are their extremes; so reality is not composed by material points, but by metaphysical points.² So, Leibniz is here first concerned by the “category mistake” made by the “remarkable author”, who does not carefully distinguish between the ideal and the real; essence and existence. The observation of this error leads him to discuss the relation of the ideal space in conceiving reality: If it is true that we rely on ideal notions in organizing reality, there are essential differences among things as idealized and things as they are phenomenologically presented to us: material bodies. The rest of the letter focuses on the virtues and limits of a “mathematization of the real”. If it helps us in organizing and conceiving reality, the *ideal cannot exist as we conceive of it*. The passage from the ideal to the real made by the Duke is therefore invalid and can lead us astray when we cognize reality.

The main thought Leibniz develops in the rest of the letter concerns the limits and prizes of using the ideal to conceive the real. The limits consist in the different principles that govern the two realms: If the ideal is thought *quantum continuum*, the real exists *quantum discretum*. Leibniz spells out “quantum discretum” as the variety that characterizes the created world, where everything is made from organized and structured bodily parts (actual divisions). The concrete determination of the parts we find in nature makes everything different from each other: two perfectly identical things cannot exist. In dealing with the external world, the imaginative processes are constrained by the variety and

¹ See for instance Leibniz to Sophie, December 29th, 1692/ January 8th, 1693 (A II 21 639/Strickland 100).

² Leibniz to Remond (March 14th, 1714; GP III 611-15): “and space precisely is nothing but an order of coexistents, while time is an order of existents but not simultaneously. Insofar as parts are not marked in what is extended by effective phenomena, they consist in nothing others but in possibility, and they are in the line as fractions are in unity. But when we suppose all possible points as actually existing in a whole (a thing we should grant if this whole were a substance composed of all these ingredients), we are pushed into an inextricable labyrinth”

actual divisions of things: we are not presented with a void geometrical space, but with a plenum actually divided through God's organization of the existents which *we, finite minds*, reduce to space-time relations.

One will be able to make yet another objection, which is that geometry shows that space, or the line in space, is not composed of points, which are not parts, but only extremities. I reply that in that case space must be distinguished from matter. Space, or unchanging place, is an ideal thing, as is time, and concerns the possible as actual. This is what constitutes *Quantum continuum* (a magnitude in which there is no separation at all), which is indifferent to all possible divisions, just as number is in relation to all the fractions one can make from it. But matter, which is real, is *Quantum discretum* (a magnitude already divided), just as a whole number is in relation to unities, from which there results the divisions which can be made in matter by successive operations, being actually already made there from the outset by nature, which has distinguished from all time what will be able to be detached from another, and is different from it, *whether one thinks of and notices the separation or not.*³ It is this difference between space and matter which had not been well observed, and which had diverted men from the knowledge of unities, that is, of the true elements and principles of substance. (Strickland 342)

Existing things are actually divided and organized by the perfect intellect of God who creates as much variety and order as he can. The ideal –as far as it is governed by the principle of continuity– introduces identity and therefore indeterminacy in the actual divided world: in the ideal realm it is possible to have perfectly identical objects, like two spheres or two leaves, but not in the real world.

There are actual varieties everywhere and never a perfect uniformity, nor two pieces of matter completely similar to each other, in the great as in the small. Your Electoral Highness knew this well when she told the late Mr. D'Alvensleben in the garden of Herrenhausen to see if he could find two leaves whose resemblance was perfect, and he did not find any. Therefore there are always actual divisions and variations in the masses of existing bodies, however small we go. *It is our imperfection and the shortcomings of our senses which make us conceive physical things as mathematical entities, in which there is indeterminacy.* And it can be demonstrated that in nature there is no line or shape which reproduces exactly and preserves uniformly throughout the least space or time the

³ Note that this phrasing is the same used in NE 309 against Locke.

properties of a straight or circular line, or of some other line whose definition can be grasped by a finite mind. In bodies, whatever shape they might be, the mind can conceive and draw through it using the imagination any line that one cares to imagine, just as one can join the centers of spheres by imaginary straight lines, and conceive axes and circles in a sphere which does not have any actual axes and circles. But by concealing the small inequalities (*which is required when abstracting, in order to be able to reason*), *the mind puts perfect uniformities into nature*. For although they exist only in idea, we come across them enough in practice, the irregularities being insensible. Now in a perfect uniformity and continuity, there is no determinate part. This is why a thing which is continuous, either in itself or in abstract, such as an hour, a straight or circular line, etc., can be divided, *but the only actual parts one should recognize in it are those that one actually makes in it*. So all the parts one makes in it have extremities, which are points or moments, but these continuous things are not in any way a result of points. In ideal things in which in certain respects there is uniformity, which is the source of continuity, *the whole is prior to the part*, but in realities, where there is always discrete quantity, unities are prior to the multitudes, or results. (Strickland 328; my emphasis)

In dealing with the external world, the imagination, does not work anarchically, tracing any line it can imagine. It is constrained by both the actual divisions in the external world and the innate notions which structure image-types. Straight lines, points, hours help us in structuring phenomena and reducing them to image-types, but they are not real. The work of the imagination in the field of mixed mathematics is to find regularities of shapes and to reduce the variety of things to similarity structures. In so doing, minds interiorize image-types which allow them to handle different things as-if they were uniform in *kind* before they form a clear and distinct notion of *that* kind. We can track human bodies as similar in type before having a concept of “human being”, for instance. This useful fiction⁴ laid the ground for categorization and for dealing with the variety of things. If we didn’t use fictions, the variety would overwhelm finite minds.⁵

The work of the imagination has significant cognitive payoffs. It introduces continuity and indeterminacy in a world which is actually determined and structured in its diversity, to the least of

⁴ The term fiction here must not lead us astray. “Fiction” does not mean that what we imagine is completely detached from reality; the analogy relation between the things represented and the image warrants the reality of the fiction as an expression of something existent, but at the same time stresses that image-types as conceived by the mind are incomplete essences which could have never be actualized by God. VI 2 488: “Fiction is a thought of non – existent. (no fiction unless possible is in the mind; it is in words).”

⁵ The topic of general notions as indispensable to finite minds to deal with the variety of the world is pivotal in NE 275.

its parts, by God. Nonetheless, the indeterminacy introduced by “limited essences” (A VI 3 463), essences which can be thought by finite mind, enables the mind (i) to consider many complex things simultaneously; and therefore (ii) to overcome the structural limits of the finite mind, incapable of intellectual intuition. The simplification introduced by the imagination enables the mind to consider complex things *as if* they were simple by producing general images, i.e. fictive place-holders of the fine-grained reality which maintain an analogy relation to the things represented. Even if the place-holders are undetermined and contain some errors, the indeterminacy introduced is so small that we can neglect it, for it won’t change the truth we can reach through the fiction.⁶

However eternal truths based on limited mathematical ideas are still useful to us in practice, in as much as it is acceptable to set aside the inequalities too small to be able to cause significant errors in relation to the proposed purpose; just as an engineer who draws a regular polygon on the ground is not bothered if one side is longer than another by a few inches. (Strickland 338)

The ideal [unities] represent a whole which is not a perfect unity, but which our understanding takes *as one thing*, even though it is an accumulation of several, *in order to have the convenience of reasoning about several things all at once*, and that which is common to them and which has a connection not only to nature but also to existence. (Strickland 328, my emphasis)

The work of the imagination, hence, is to simplify reality in a way accessible to finite minds. Through this simplification, finite minds can compare things simultaneously *as if* they were simple. Even if the image-types produced by the imagination are not blind symbols⁷, since there is no language at work yet, they share a significant characteristic with blind symbols: enabling the mind to *coperceive*

⁶ Notice that the same words are used by Leibniz to justify the use of the infinitesimal in his infinitesimal calculus. An example is Leibniz’s letter to Varignon in GM 4 89-94.

⁷ Blind thoughts or symbols are combination of signs that are cognitive tools deployed by the mind to think of the things expressed. Words used as expressions of complex concepts are examples of blind thoughts. Blind thoughts are simpler than the things they represent (“man” is a word expressing a combination of notions composing it, like being rational, being an animal, being capable of laugh, and so on). The simplicity of blind thought allows minds to conceive of a variety of things simultaneously (*uno obtuto*) without the need of being conscious of all the marks composing the things. In a letter to Gallois (1672), Leibniz brings the number 100 000 as an example of blind thought: if the number is actually composed by 100 000 units, the mind can use the symbols as a place-holder for a chain of addition (1+1+1+1+...). The use of the blind thought is more than an abbreviation, since it enables the mind to perform operations which it could not perform without the symbol. Therefore, Leibniz often claims that we operate with signs as if we were operating with ideas themselves. For a discussion of blind thoughts see Dascal (1987); Favaretti Camposampiero (2007); Meier-Oeser (1997; 2011).

as many things as it could simultaneously and, in so doing, to discover relations of similarities among them.

This simplification has the further payoff of directing memory and attention to focus on the common aspects of things, without being diverted by many details which characterize real existents. In so doing, bodies appear to us simpler than actual perfect images of them. Their simplicity allows us to compute and compare images *as if* we were dealing with the real things themselves, exactly as blind symbols allow to computationally work with characters *as if* we were computing ideas.⁸ Now that it is clear what exactly is the task of the imagination, we need to understand how it fulfils that task and what achievements —and risks— there are in using image-types.

4.6. The Work of the Imagination and the Need of Image-Types.

Both ISM and EGDB argue that the imagination has a specific cognitive task: tracking regularities of shape and size in bodies' variations over space and time. What follows is an attempt to reconstruct how this happens and why we need to introduce image-type to understand this process.

First, imagination segments reality by tracing the boundaries of things and make one consider the whole before the parts. As Leibniz claims, this segmentation corresponds to the perception of the actual division of things.

In matter and in actual realities the whole is a result of the parts; but in ideas or in possibles (which includes not only this universe, but also every other universe which can be conceived, and which the divine understanding actually represents in itself), the indeterminate whole is anterior to the divisions [...] (Strickland 337)

(Note the reference to the possible; we will come back to this soon). The segmentation consists in the imagination tracing lines to delimit things in reality. It reduces the actual variety of things to shapes. The work of segmentation when dealing with the external things in the world is not equivalent to tracing lines in the void ideal space. In segmenting the external world, the imagination is constrained by the actual divisions of things. Consider your actual perceptual environment. If you can imagine

⁸ “Thus when I think of a chiliagon, or a polygon of a thousand equal sides, I do not always consider the nature of a side and of equality and of a thousand (or the cube of ten), but I use these words, whose meaning appears obscurely and imperfectly to the mind, in place of the ideas which I have of them [...]. Such thinking I usually call blind or symbolic.” (MKTIL 292/ A VI 4 591).

drawing many arbitrary lines that go from one body's position to another body's position, you cannot stop seeing bodies with actual boundaries. An arbitrary way of dividing is not how imagination works in segmenting bodies which already have actual confines, as do things existing in the actual world, where things are detached from each other "from the outset of nature", whether we notice it or not.

The first principle that governs the imagination is "whole before the parts". Remember that the whole-parts relation was a relation apprehended by the coperceptibility of coexistents. The imagination produces images of coherent wholes not by composing their parts; it begins with the coherent whole and then it detaches the parts through more detailed observations. Moreover, through the observation of whole-parts behaviors over space and time, we learn to track body-types variations as changes of the *same body-type*. Two further innate ideas function as constraints in interiorizing body-types behaviors: space and time.

Leibniz explains how we come to imagine space in many texts. The most famous one is a passage of the fifth letter to Clarke.⁹ However, I prefer to appeal to an earlier text, *Definitiones cogitationesque metaphysicae* (1677 – 1681?), not only to show that Leibniz endorses this view on imagination early in his philosophical career; but because here an important connection between time, space and human minds' conceiving of bodies is made. The representation of a body is based on image-types structured by those constraints. Moreover, human minds, Leibniz maintains, irreflexively assume that objects do not change without a *reason*.

Here we already encounter a certain general consideration of space when we assign a situation to phenomena and we observe the distance of things and also of the angles, which *do not change without a reason*. So, if we posit something in a fixed and closed place, we do not doubt to find it in that very place, unless some force or another event (*casus*) do not supervene. Also this space common to all things, and those phenomena themselves we call them bodies to which we can assign a situation (*situ*), like a star; *there is no body which is not cognized as being in that general space and which has some distance from other bodies*. When a change happens, which varies the situation assigned [to the body], in this case, to avoid confusion, *we devise a mode of distinguishing those things which happens prior or posterior or simultaneously*, by referring everything to changes of those things which are apprehended as homogenous, such as the movement of

⁹ Leibniz's Fifth Letter to Clarke, § 47 ed. by R. Arriew (2000: 45-6) / GP VII 400. The beginning of the text is interesting for us: "I will here show how men come to form the notion of space to themselves. They consider that many things exist at once, and they observe in them a certain order of coexistence, according to which the relation of one thing to another is more or less simple."

the stars; also this consideration of the things with themselves is said time, which is something general, and includes all things together, *nothing can happen which is not prior or posterior or simultaneous to any other given thing*. [Hinc jam obitur consideratio spatii cujusdam generalis dum phaenomenis situs quidam certi assignantur distantiaeque rerum observantur atque anguli, qui sine causa non immutantur. Ita si quid loco fixo clausoque reponimus, id eo loco iterum reperire non dubitamus, nisi vis quaedam aut alius casus supervenerit. Atque hoc spatium omnibus commune est, et ea ipsa phaenomena vocamus *corpora* quibus situm assignare possumus, ut stellas; nullumque est corpus quod non in spatio illo generali esse, et a dato alio corpore distare cogitetur. [...] Cum autem contingant mutationes, quae situm assignatum perturbant, hinc evitandae confusionis causa, excogitatus est modus distinguendi quae quibus sint priora aut posteriora, aut simul, referendo omnia ad mutationes illas quae deprehensae sunt uniformes, quales sunt motus stellarum; atque hic rerum inter se respectus dicitur tempus, quod etiam generale est, cunctaque complectitur, nihil enim contingere potest, quod non sit prius vel posterius vel simul alteri cuilibet dato. (A VI 4 b 1397)]

The text is relevant not only because it explains how we form notions of space and time; it introduces the notion of body (*corpus*) which is not simply given in the simultaneous coperception of coexistents. It is a more structured *phenomenon* which cannot but be *conceived* as a body occupying a position in space (*situs*) and whose changes do happen prior or posterior or simultaneously to other things' changes, i.e. in time. We, finite human minds dependent on the imagination, cannot strip away the conception of a body from space and time. To form the notion of body, an abstraction process is at work based on an imaginary modelling of the bodies perceived as *wholes* changing position in space over time. This more unified type of image is a representation of a phenomenon. A specific capacity of the imagination is essential for this formation: that of producing an act of coimaginability by retaining images of object at t_1 and object at time t_2, t_3 , and comparing how they have changed position in space and time.

I insist that talk of “bodies”, “time” or “space”, or of the principle of sufficient reason latently assumed as a condition for change, are here innate constraints of the mind in constructing image-types.^{10; 11} The mind does not possess distinct notions of them when it starts structuring perceptual

¹⁰ Leibniz does not give a complete list of innate ideas, but those quoted are usually listed among them, see NE 152 for space and time as innate, and NE 52.

¹¹ A VI 4 528: “We consider many things not as they are in themselves (*secundum se*), but according to how we conceive of them and how they affect us. (*secundum modum quo a nobis concipiuntur et nos afficiunt.*)”

presentings into phenomena, for it might still not be capable of defining those notions. In particular, space and times are here rules of ordering phenomena *nebeneinander* and *nacheinander*. Leibniz assumes space and time as constraints or structures of the imagination to interiorize image-types. Let's bring a concrete example.

Look at what surrounds you in your environment. Focus on the table or any other bodies (artifacts or a living ones) in front of you. All those things are made of parts which are per se determined. The table consists of a surface and four legs, but the imagination presents it to you as *one* coherent whole. Now suppose there is something on the table. You can move it and see that the table does not move with it; that they can occupy two different places at two different times. In so doing, you track a different shape from that of the table at different times and at different distances from the table. Moreover, you can track the body you move and observe that it is the same shape that changes place in time.

This reduction of bodies to shapes allows you to interiorized image-type and store them in memory. Once you have segmented the things in your room, you spontaneously start ordering them according to similarity of shapes. Through this ordering, you cancel out particular determinations of those things and produce a further level abstraction.

But by concealing the small inequalities (which is required when abstracting, in order to be able to reason), the mind puts perfect uniformities into nature. For although they exist only in idea, we come across them enough in practice, the irregularities being insensible.
(Strickland 328)

Through this process of comparison and confrontation, minds interiorize image-types of: (1) different bodies (for instance the cup in front of you); (2) different body-types (for instance of cup in general or human body in general); (3) property-types (for instance green). The more we experience bodies' behavior, the more image-types we store in memory. Here's another example.

Imagine a child in a room where there are objects of three different shapes: cube, sphere, and cylinder. There are many cylinders, cubes, and spheres, and all differ among each other in terms of size, colors, tactile qualities, materials. In ordering them per shapes, the child cancels out all those differences and produces a very abstract image: an ideal body which has as its property only shape. In this way, she can forms an image that somehow resemble any spheres, but it does not exactly represent any of them.

Once the child forms an image of objects as whole, she can start gathering them per other qualities: size, tactile qualities, colors. When she orders them based on colors, for instance, she starts ordering

them on a magnitude scale: Things that look greenish are gathered together and opposed to yellowish and so on. In this way she interiorizes an image-type of green. This image-type differs from any real green body in the world because it is neither rough nor smooth, neither spherical nor cubic; it's not made of a particular material and it can tolerate a range of variation in intensity of green: it may be darker or lighter and still be green. But when we try to imagine it, we imagine a particular extended surface with a particular shade of green. This surface lacks any determinacy proper of real existing bodies (it does not have a shape, is neither rough nor smooth, etc.). It is an abstract image of that quality constructed on the base of an image-type. The abstract image cannot exist as it is in the imagination. By the same token, this very image of green is not an image-type, for it is a particular shade of green.

By interiorizing image-types, human minds enter into the ideal world, where things are possible, but not existent. In this way, they can reproduce bodies and their behaviors in their imagination. Let's specify that that image-type green is a possibility *because* it potentially entails all possible modes of presentations of greenish things, without reducing to any of them, not even to the shade of green one actually perceives because this is only one possible way green, as an abstract property, can be.

4.7. Image-Types as Schemata.

The function of the imagination is to *coherently* organize into a whole the presentings of the senses according to notions of the common sense, i.e. shape and size. This whole is what I called a representation construed on the basis of image-types. Image-types are interiorized possible ways things *can* be. If I should find an alternative expression available in the history of philosophy to explain what image-types are, I would call them *schemata*, for they are ways of ordering and constructing expressions of things based on space-time relations which exist only in the mind and cannot be consciously represented by the mind.¹²

¹² Kant introduces the notion of the transcendental schema because his theory of category faces a problem: the non-homogeneity between *Erscheinungen* and pure concepts of the intellect. A plate is round and we can intuit its being round, but its being round is not homogeneous to the concept of a circle, such as the concept could be apprehended through the appearances. How do we subsume the perceptual presentings under concepts? The schema is a mediation between them, because it to some extent sensible, and to other extent intellectual (B 177/ A 138). Kant makes clear that the schema is not an image. "In fact it is not images of objects but schemata that ground our pure sensible concepts. No image of a triangle would ever be adequate to the concept of it. For it would not attain the generality of the concept, which makes this valid for all triangles, right or acute, etc., but would always be limited to one part of this sphere. The schema of the triangle can never exist anywhere except in thought, and signifies a rule of the synthesis of the imagination with regard to pure shapes in space." (A 141 /B 180) As we have seen, also for Leibniz image-types are not something which could

Basic image-types are more than simple reproduction of the external presentings in the mind, for image-types organize the perceptual presentings in a whole due to spatio-temporal and parts-whole rules of construction extracted on the basis of things' similarity. They preserve the type-identity of the body or property perceived over their spatio-temporal modifications, and they allow for different levels of abstraction and ordering of the perceptual presentings. The phenomenon construed on the basis of image-types is more than an image because: (i) it precedes the distinction into parts; (ii) it is a *dynamical* expression which enable minds to track the coherence of phenomena and predict their behaviors; (iii) it serves as a form of mental imagery to conceive the possible. This means that image-types *record* information on the range of movements and changes parts can or cannot undergo in relation to a whole and in relation to the quality and quantity they may or may not present. In this last part, I want to discuss three issues concerning image-types: their being habitual expressions; their relation to modality (to impossibility and necessity); their dependence on innate constraints.

Image-types and habits: In *What is an idea?*, Leibniz characterizes images as expression-relations based on habits. Starting by this characterization, I want to remove an ambiguity that may have emerged in my description of image-types: image-types are not mental objects posited by the human mind *between* the things and the act of comparing them; we do not consciously mentally represent them when dealing with external object. Once we are instructed by repeated observations to conceive of green, for instance, we are not consciously aware of the image-type green in recognizing green-things. We do this in a habitual, interiorized way of dealing with the external objects: once we interiorize image-types, we perceive the world coherently, i.e. we have expectations of how things could or could not be, even if we are not aware of it.

An unconscious entertaining of image-types *habitually* relates to the phenomena actually perceived because image-types are interiorized in observing the phenomenological behavior of different kinds of bodies in space and time. Through repeated observations of *regular* behaviors of things and *regular* effects of them on a subject, the minds learn to process perceptions of particular bodies faster, based on the *types* of bodies. (Think of how fast a piano player moves her fingers on the piano after a lot of exercising.) "Habitual" means that the subject acquires a facility and promptness in structuring the phenomena because of an image-type.¹³ It may be described as unconsciously "opening" a file of information about the body-type. Image-types are rules of constructing phenomena (i) to predict

exist outside the mind and are a dynamical modelling of the imagination. I am inclined to understand them as some rules of constructing phenomena based on their similarities.

¹³ A VI 4 B 1434: "Habit is an easiness in acting, generally it is asked, whether there also is a habit in being acted upon? I think so."

and/or expect some behaviors of the thing expressed; (ii) to inform how we should behave with the object. On image-types we base our know-how attitudes towards the world. Stored in my image-type “fire” there is the feeling of pain, for instance. The image-type active in my future experience of fire prevents me of touching it because I expect that it will burn as it did in the past.

Image-types are therefore the ground for *coherence*. Coherence is a *property* we attribute to phenomena when they react as we expect them to and is a *mark* of their existence. Coherence together with vividness of the perceptual presentings is for Leibniz a prove of a phenomenon existence.

At the beginning of the fourth book of NE, Leibniz refers to the imagination as a faculty which must be “trained”. A promptness in conceiving of kinds of bodies presented to the mind is the result of this training. Leibniz considers this promptness in conceiving to be preparatory to perfect the act of judging about the truth and falsity of things represented proper to the intellect:

Knowledge can be taken even more generally, so that it is involved in ideas and terms before we come to propositions and truths. If someone looks attentively at more pictures of plants and animals than another person, and at more diagrams of machines and descriptions and depictions of houses and fortresses, and if he reads more imaginative novels and listens to more strange stories, then he can be said to have more knowledge than the other, even if there is not a word of truth in all that he has seen and heard. *That is because the practice he has had in portraying in his mind a great many actual, explicit conceptions and ideas makes him better educated, better trained, and more capable than someone who has seen and read nothing* –provided that he takes nothing in these stories and pictures to be true which really is not so, and that these impressions do not prevent him in other context from distinguishing the real from the imaginary, the existent from the possible. (NE 355-6)

Condition for a successful training is that the mind learn to distinguish real and imaginary phenomena, where imaginary refers to objects which can be conceived, but do not exist. In other texts, Leibniz considers two criteria to be relevant to this aim: vividness and coherence of perceptions. In “On the Method of Distinguishing Real from Imaginary Phenomena”, Leibniz distinguishes two different way of constructing a coherent phenomenon: (i) we form hypotheses on the phenomenon; (ii) it conforms to the “customary” of nature:

Let us now see by what criteria we may know which phenomena are real. We may judge this both from phenomena itself and from the phenomena which are antecedent and

consequent to it as well. We conclude it from the phenomenon itself if it is vivid, complex, and internally coherent (*congruum*). It will be vivid if its qualities [...] appear intense enough. It will be complex if these qualities are varied and support us in undertaking many experiments and new observations. [...] A phenomenon will be coherent when it consists of many phenomena, for which a reason can be given either within themselves or by some sufficiently simple hypothesis common to them; next, it is coherent if it conforms to (*consuetudinem servat*) the customary nature of other phenomena which have repeatedly occurred to us, so that *its parts have the same position, order, and outcome in relation to the phenomenon which similar phenomena have had*. Otherwise phenomena would be suspect, for if we were to see men moving through the air astride the hippogryph of Ariostus, it would, I believe, make us uncertain whether we were dreaming or awake. (L 363-4/ A VI 4 B 1502)

To sum up, the habitual character of image-type consists in a constant and ruled way in which the ordered whole-part relations constituting the phenomenon are experienced by us under different circumstances over time. We have the capacity to retain, organize, and unify those bits of information into an image-type. Once acquired, image-types latently guide our dealing with phenomena by directing memory and attention to aspects of the appearances of bodies which are salient to considering those bodies as instantiations of a *type*. Those faculty involuntarily linger on some aspects of the phenomenon and unconsciously recall information gathered over time, which allow the mind to predict an object's behavior in space and time. I expect human body-type to walk and hippogryphes to appear only in fairy tale. If I see a man flying on a hippogryph, I have the feeling that something has gone tremendously wrong either with me or with the world.

Image-types are therefore interiorized ways of comparing and predicting the behavior of phenomena. This is not manifest in our usual way of dealing with objects: we need not to explicitly imagine all possible coherent way in which a body or parts of the body can move in space when we look at what's surrounding us; we could not explicitly process such a huge amount of information. We notice that we do (i) when something appears incoherent to what we expect; (ii) when someone explicitly invites us to model something in the imagination (imagine-that-cases).

Image-types and the (im)possible: There is an implicit risk in relying on the imagination. The imagination can lead us astray and make us imagine something's possible but which cannot exist in the actual world. A real human body, for instance, cannot turn its head of 360°, but we can imagine it, even if we usually do not expect this to happen to a real body. The fact that in imagining we can

conceive of object's behaviors which are (physically) impossible is a signal that image-types are abstract possibility which belong to the ideal. However, when they are used to cognize existents, human epistemic subjects learn very soon to distinguish between the possible *qua* existent and the possible *qua* ideal (the real and the fictional, to use Leibniz's jargon).

Although imagination can lead us astray, the work of the imagination can be hardly considered a limitation of the human mind or an impediment to knowledge. It introduces coherence into the phenomena by organizing the disconnected bits of information derivable from each sense and from the common sense. The coherence given by the imagination through the application of some dispositional organizational rules (what Leibniz calls innate notions) adds intelligibility to the sense-data and makes images which express body-types constructed on the bases of interiorized image-types knowledge of the clear kind, though still confused.

Image-types and innate ideas: When Leibniz says that we form image-types by combining distinct notions with notions of sense-perceptions, he does not mean that the mind applies some distinct notions to perceptual presentings. Image-types are pre-conceptual and pre-reflective because they do not require the explicit grasping of concepts expressed through propositions. One can imagine a human body; recognize it, predict its movements, and yet she may not be capable of defining it. Notice moreover that due to Leibniz's theory of *cognition caeca* one can even have words to refer to a human body and still lack a clear and distinct notion, for she is not capable of giving any definition of it. Animals for instance can even be capable of using words to refer to things; all they need is a mental image, and not the possession of concepts.

The process of ordering phenomena by means of similarities is not accomplished by being guided through an explicit grasping of the notions according to which we compare images. Instead, the process is guided by innate ideas which function as rules or modes governing the imagination. Innate ideas function as constraints which delimit what the imagination can or cannot conceive. One does not need to have a concept CUBE in order to compare cubes as indeed one will never ever have a distinct concept of GREEN, in Leibniz's view, for this is *per se* confused. One can produce images of the things in front of her by segmenting them. Those images *express* the external cubes because they resemble them. To this extent, the expression relations is natural. It is important to insist on this character of image-types: natural means that it is not based on any arbitrary imposition, like in the case of signs; it is a natural expression *because* it is based on the resemblance between the body and the image we can form of it. By the same token, the process of ordering bodies based on similarity relations is a computational process that imagination undertakes spontaneously.

Image-type and necessity: After this long analysis, we can now return to the issue posited at the beginning of the chapter. Why does Leibniz contest Locke's claim that categorization starts by forming "ideas" of individuals, and claim that we begin by conceiving species? Does this imply that the subject possesses a distinct notion of a species? We can answer this question negatively and establish that the subject possesses a clear and confused notion of a species based on the capacity to construct an image which does not express a particular body, but a body-type.

The work of introducing indeterminacy in the world has the payoff of idealizing things in a way that makes them digestible for the intellect which can then operate on them and search for the *reasons* why things are similar. The price paid in terms of determinacy is paid back in terms of distinctness brought by the intellect. Once the ordering work is laid down, the intellect can search for a reason for image-types similarity. It is the answer to the question "why things are similar?" that gives rational minds a concept of the thing. In this way, therefore, we categorize existing and non-existing things.

Uniformly ordered continuity, although it is only a supposition, forms the basis of eternal truths and necessary knowledge, and is the object of the divine understanding, whose rays illuminate our understanding too.¹⁴ It is no more a substance or actual thing outside the mind than is abstract and ideal number, and yet time and space ground sciences made up of truths *which act as rules for existing things*, since the divine understanding, whose objects they are, is the source of existing things. Moreover, these truths never deceive us, since they are, like number, hypothetical or conditional, but we are deceived in fact when we suppose, through lack of practice or circumspection, more regularity in matter than there is in it. It must also be considered that time and space are indeterminate, that they are adapted not only to the divisions and varieties which actually occur in nature, but also to all the other possibles which can be conceived in them. A good story is as well ordered with regard to time as a true history. (Strickland 329)

As the passage goes, image-types of possible existing and non-existing objects allows to form abstract representations of body-types or property-types and order them in a continuous chain. This ordering serves as a basis for necessary truths, even if similarities cannot show us what necessity is. In the passage of *Nova Methodus* quoted above, modal notions were also derived from the co-perceptibility of things. Nonetheless, Leibniz stresses in EGDB that imaginability is only the *basis* for deriving

¹⁴ In a letter to an unknown correspondent (October 1707; forthcoming in II 5), Leibniz clarifies that all species are in God's mind as an ordered chain of distinct ideas which we imitated throughout classification. We will discuss this topic in the next chapter; a similar idea is stated also in NE 307; 474.

necessary truths. Necessity is not something we can represent via imagination. If through imagining we can learn how things *possibly* are, it is only the intellect that teach us what necessity is.¹⁵

The limits of the imagination in the derivation of necessary truths is clearly stated in a passage of EGDB where Leibniz reports and discusses an argument against the immortality of men that is based on inductive evidence. The argument, as reported by Leibniz, casts doubt on the idea that because we know that our ancestors died, we also know that we are going to die, *because* their death does not bear any causal relation with our lives. Leibniz observes that the argument does not address the right *relation* between the premises and the conclusion: it is not a matter of causality bore by my ancestors' death on my life. The similarity which characterizes me and my ancestors is the signal that there must be a *reason* for this similarity and this reason is the cause of our death. Since this reason persists in all similar things, we can know that we are going to die too:

The problem is that we resemble them a little too much, in that the causes of their death also subsist in us. *For the resemblance would not be sufficient to draw certain consequences without the consideration of the same reasons.* (Strickland 243; my italics)

Only the acknowledgment of a great similarity makes us infer some common formal cause for all those individual. The reason found, however, is something implied by the similarity of my ancestors and me, but the similarity per se is not the reason of our death: the fact that we have a body which decomposes, subject to physical and biological laws is the reason that only the intellect can find. Without the preliminary work of the imagination and a first ordering of things based on similarity, however, the intellect would not search for reasons because it would be groping in the dark; it would not know what to search for. Nonetheless, the imagination alone is not sufficient to give us necessary knowledge properly. If the intellect can work on images which express body-types, it is because they are formed through "intelligible principles", though in ordering those principles are not yet explicit to the mind. Those principles work as constraints and rules to organize the perceptual presentings coherently.

The open question is, therefore, how image-types serve as the basis for the acquisition of different kinds of notions: sensible, imaginable, and intellectual. In this way, I shall give a (first) answer to

¹⁵ On this aspect also NE 452: "[...] what I value most in geometry, considered as a contemplative study, namely is its letting us glimpse the true sources of eternal truths and of the way in which we can come to grasp their necessity, which is something that the confused ideas of sensory images can never distinctly reveal." On Leibniz's insistence in NE that images cannot provide us with necessary truths, see also (Bolton, Locke's Essay and Leibniz's Nouveaux Essais: Competing Theories of Universals, 2017).

why “humans tend to explain through things subject to the imagination also those things which cannot be imagined by them” (homines etiam ea quae imaginari non possunt per res imaginationi subjectas explicare conantur. A VI 4 A 890). Before moving to chapter 5., however, we need to spell out a doubt which may concern the reader: to what extent are image-types different from animals’ images?

4.8. Conclusion

Imagination is not an anarchic faculty, for it responds to its own logic shaped by rules of constructing and processing phenomena. What acts as rules are innate powers of the mind. These rules enable the mind to perform two acts of conceivability: copreceptibility of coexistents and coimaginability of phenomena based on image-types. The mind has an innate disposition to track similarities based on quantity and quality and, in so doing, to produce a particular kind of natural expressions: abstract image-types which retain information on the behaviors of bodies and their parts in proportion to the whole they compose *as* occupying space and time. These image-types resemble the *kinds* of bodies they represent because of the structural relation they maintain with the parts of the things expressed as they exist in nature. Even if those things are highly determined and different from each other, the fiction introduced by the imagination allows to deal with them *as if* they were simpler as the image-type. The image-type functions as a cognitive tool to dynamically modelling phenomena in the imagination, and allows minds to predict the behavior of things and the coherence of the phenomena presented by the senses. Image-types, moreover, disclose the realm of the possible, enabling the mind to also conceive of possible yet non-existent modifications of objects and, in so doing, to conceive the (physically) impossible too.

So far, *conceptibilitas* remained out of our picture. I will show that *conceptibilitas* is but a different function of the imagination in dealing with a different kind of expression: signs as semantically and grammatically ordered systems, which represent divisions in essences. The conceptual divisions of essences result into definitions. The copreceptibility of signs as representing further *distinctions* of essences is the cognitive process which supports the acquisition of concepts. In the texts analyzed, Leibniz furnishes a hint on how minds move from the possibility conceived via image-types, to conceive how things necessarily are. The ordering of the imagination based on similarity serves as a basis for the intellect to search for reasons for gathering individuals in identity classes. Chapter 5 investigates into the use of similarities and image-types to form three kinds of concepts: sensible, imaginable and intellectual concepts as presented in NE.

§ Bibliography

A: Works of Leibniz

- A *Sämtliche Schriften und Briefe*, Berlin: Akademie Verlag/ DeGruyter, 1923ff. cited by series, volume and page.
- EDGB Leibniz to Sophie (November 1705): “On the Element of Geometry of the Duke of Burgundy.” In: *Leibniz and the Two Sophies: The Philosophical Correspondence*. Trans. by Lloyd Strickland. Centre for Reformation and Renaissance Studies, 2011, pp. 321-343.
- ISM Leibniz to Sophie Charlotte (March-June? 1702): “On What is Independent from Senses and Matter.” In: *Leibniz and the Two Sophies: The Philosophical Correspondence*. Trans. by Lloyd Strickland. Centre for Reformation and Renaissance Studies, 2011, pp. 220-239.
- GP *Die Philosophischen Schriften von Gottfried Wilhelm Leibniz*. Ed. by, Gerhardt, Immanuel Carl. Berlin: Weidemann, 1875-90. Repr. Hildesheim: Olms, 1978. Cited by volume and page.
- L *G.W.Leibniz. Philosophical Papers and Letters: A Selection*. Amsterdam: Springer, 1989.
- NE *Nouveaux Essais sur l’entendement humain*. In A VI 6 cited by page.
- MTKI *Meditations on Truths, Knowledge, and Ideas*. In: L 291-295
- Strickland *Leibniz and the Two Sophies: The Philosophical Correspondence*. Trans. by Lloyd Strickland. Centre for Reformation and Renaissance Studies, 2011

B: Other Primary Sources

- KrV Immanuel Kant, *Kritik der Reinen Vernunft*. In: *Kant, Critique of Pure Reason*, trans. by P. Guyer, & A.W. Wood, Cambridge: Cambridge University Press, 1998.

B: Secondary Sources

- Bolton, M. B. (1996). The Nominalist Argument of the New Essays. *Leibniz Review*, 3.
- Bolton, M. B. (2006). Leibniz and the Limits of Perception. In H. Breger, J. Herbst, & S. Erdner (Ed.), *Einheit in der Vielheit, VIII. Internationaler Leibniz-Kongress, Hannover, 24. bis 29 Juli. I*, pp. 94-100. Hannover: Druckerei Hartmann.
- Bolton, M. B. (2017). Locke's Essay and Leibniz's Nouveaux Essais: Competing Theories of Universals. In S. Di Bella, & T. M. Schmaltz, *The Problem of Universals in Early Modern Philosophy* (pp. 220-52). Oxford: Oxford University Press.

- Dascal, M. (1987). *Leibniz. Language, Signs and Thought*. Amsterdam/Philadelphia: John Benjamin Publishing & co.
- De Risi, V. (2007). *Geometry and Monadology. Leibniz's Analysis situs and Philosophy of Space*. Basel/Boston/Berlin : Birkhäuser Verlag.
- Di Bella, S. (2004). Multum interest inter terminos et res. On Leibniz Theory of Distinction. In M. Carrara, A. M. Nunziante, & G. Tomasi, *Individuals, Minds and Bodies: Themes from Leibniz* (Vol. Studia SH 32, pp. 15-48). Stuttgart: Franz Steiner Verlag.
- Favaretti Camposampiero, M. (2007). *Filum cogitandi. Leibniz e la conoscenza simbolica*. Milano: Mimesi.
- Leduc, C. (forthcoming). Imagination and Reason in Leibniz. *Studies in History and Philosophy of Science*.
- Lowe, J. (2008). Two Notions of Being: Entity and Essence. *Philosophy*(83), 23-48.
- Meier-Oeser, S. (1997). *Die Spur des Zeichens. Das Zeichen und seine Funktion in der Philosophie des Mittelalters und der frühen Neuzeit*. Berlin/New York: De Gruyter.
- Meier-Oeser, S. (2011). Leibniz' These von der körperlichkeit allen kreatürlichen Denkens. In H. Breger, J. Herbst, & S. Edner, *Natur und Subjekt. IX. Internationaler Leibniz-Kongress* (pp. 660-666). Berlin: Akademie Verlag.
- Mugnai, M. (2000). 'Alia est rerum, alia terminorum divisio': about an Unpublished Manuscript of Leibniz. In A. Lamarra, & R. Palaia, *Unità e molteplicità nel pensiero filosofico e scientifico di Leibniz. Simposio Internazionale, Roma, 3-5 ottobre, 1996* (pp. 257-270). Firenze: Leo S. Olschki Editore.
- Mugnai, M. (2010). Logic and Mathematics in the Seventeenth Century. *History and Philosophy of Logic*, 31(4), 297-314.