

ABOLISHING THE BORDERS BETWEEN NATURAL HISTORY AND NATURAL MAGIC FRANCIS BACON'S *SYLVA SYLVARUM* AND THE *HISTORIA VITAE ET MORTIS*

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Abstract. In this paper I investigate Francis Bacon's natural histories, with a focus on the Latin *Historia vitae et mortis* and the posthumous *Sylva sylvarum*. My claim is that the English Philosopher was not interested in compiling natural histories of particulars, but those of virtues, of processes, and of the hidden activity of matter. The two mentioned writings represent the exemplification of this interest. Despite their very different structures and compositions, they share many characteristics which raise them at the level of natural philosophy. As it is shown in this article, their relation with the theory of matter, the experimental practice involved, and their operative character represent elements specific to metaphysics and natural magic. Writing the 'natural histories of matter' Bacon abolishes the border between a natural historical endeavour and a natural philosophical enterprise based on the knowledge of causes.

Keywords: Francis Bacon, natural history, natural magic, matter theory, *Sylva sylvarum*, *Historia vitae et mortis*

Introduction

After Bacon's death, his secretary William Rawley published *Sylva sylvarum or a Naturall History in Ten Centuries*, a mysterious work composed of one thousand 'experiments' on a variety of topics. Given its posthumous character and consequently the lack of information concerning Bacon's intentions with this work, its status within Bacon's *Instauratio Magna* is unclear. There are two competing interpretations of this mysterious work. In my dissertation *From Natural History to Natural Magic: Francis Bacon's Sylva sylvarum* I argued that *Sylva* is more than a mere natural history, containing elements of metaphysics and natural magic. In a recent article, Dan Garber criticized this view in order to analyse the function and structure of the members of Salomon's House from the *New Atlantis*. In his criticism, he characterizes *Sylva* as an imperfect kind of natural history that is inferior to the Latin natural histories, representative of Bacon's model for a natural historical programme.¹ The aim of this paper is to argue in favour of the opinion that part of the experiments in *Sylva sylvarum* are indeed

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designed as experiments of natural magic. According to Bacon's definition, natural magic is one of the distinct sciences pertaining to his natural philosophy, this latter being characterized by the knowledge of causes. Moreover, I will show that the Latin natural histories enter the same category – they are at the border of natural history and natural philosophy. I take this mingling of history and philosophy, the describing of facts and theory, to be one of the main characteristics of Bacon's investigation of nature.

Dan Garber argues that *Sylva* is “hardly a model of natural history,”² because it is a chaotic work, tenuously organized, written in English and looks like a popular miscellany. Though I agree with this description, I do not believe these characteristics lead to the conclusion that *Sylva* cannot fit into the Baconian ‘model’ of a natural history. In fact, several Baconian scholars claim not even the Latin natural histories were written according to the model described in the theoretical works, such as the *Parasceve*, the *De augmentis scientiarum* or the *Descriptio globi intellectualis*. For example, Graham Rees names the Latin natural histories ‘hybrids’ because they contain natural philosophical elements and are highly operative.³ Further, Dana Jalobeanu distinguishes between works about natural history and works of natural history, the former being the advice on how to compile a natural history and the latter being those histories that Bacon in fact compiled.⁴ However, against these views Guido Giglioni shows that natural history and natural philosophy cannot be really separated, and thus the theory included in the Latin histories is just the normal way of compiling natural histories using the inductive method.⁵ My interpretation goes further than Giglioni's, in showing that not only that natural history and speculative philosophy cannot be separated, but the operative side of natural philosophy is constitutive for a natural history since the provisional rules and axioms of speculative philosophy must be verified through operation.

Moreover, Garber takes the Latin natural histories to be the exemplary histories of the theoretical model. In analysing the *Historia vitae et mortis*, Garber emphasizes its organization and composition. There is no doubt that compared with *Sylva*, this Latin history is much more structured and organized. But the structured organization of the Latin natural histories does not constitute a problem for the argument I make here for two reasons: first, my argument does not invoke the structured or unstructured format of Baconian natural histories, and second, I agree with Garber that relative to its format *Sylva sylvarum* might look inferior to the Latin natural histories. As a matter of fact, when arguing this previously in my dissertation, I took the fragmentary and disorganized form of writing to be a strategy for selecting the competent readers from the vulgar public⁶ while agreeing that it is highly unlikely for *Sylva sylvarum* to have a secret order, as Rawley states in his preface.⁷ It is true, moreover, as Garber mentioned, that some experiments can be used to compile natural histories on particular topics through a process of ordering and adding material. However, if we look at its content, the situation is completely different. There are striking similarities between the instances of *Sylva* and those of the Latin natural histories. I will exemplify the similarities by comparing *Sylva sylvarum* to *Historia vitae et mortis*, as Garber did. I claim that this so called ‘natural history’ also attains the

status of natural magic, in the sense that natural history becomes natural magic when the knowledge of nature becomes more detailed and arrives at forms.

I start my argument with an analysis of Bacon's concept of natural history and of the existing histories. The aim is to show that the type of histories Bacon aims at are not those that are mere collections of facts, but more complex ones containing causal explanations, similar to the Latin natural histories. Despite its organization, *Sylva* shares the same characteristics. Then I turn to the relation between the historic-philosophical investigation and Bacon's matter theory, emphasizing the kinds of entities that are subject to each science. In the last section of this paper, I briefly present the arguments for considering some experiments in *Sylva sylvarum* as elements of natural magic. Finally, I analyse the *Historia vitae et mortis* in order to show how, despite their very different structures, the two writings are very similar regarding both their contents and their characteristics that coincide with the ones Bacon assigns to natural magic.

Histories of particulars and histories of matter

As described above, Bacon's conception of natural history has brought about a number of different interpretations from scholars. Did Bacon change his mind about what a natural history should be and how it should look from *Parasceve* to the Latin natural histories and then again from these to *Sylva*? Does he have a single 'theoretical' model along with several 'practical' ones that differ between one Latin natural history and another, and then differ again in *Sylva*? Or did he have a unique conception that can only be noticed when theory and practice are analysed together?

One of the most recurrent problems in the Baconian scholarship is that it seems to work with an unclear concept of 'natural history'. I take this to be caused also by the fact that Bacon indeed uses the term 'history' (*historia*) in very different ways. On the one hand, it is used to describe one of the three main branches of knowledge included in Bacon's scheme of knowledge, together with poesy and philosophy. *Historia* can be natural or civil, and both these sections have further divisions.⁸ On the other hand, *historia* represents a part of a natural history, together with *observatio maior* (major observation), *intentio* (intentions), *prognostica* (prognostics), *canones mobiles* (provisional rules), *explanatio* (explanation), etc. The conclusion is that the *historia* is part of the *historia naturalis*, which contains some other elements.

This aspect has never been discussed, but there is another feature of Baconian natural histories that has been brought lately into discussion, namely the difference between the theoretical model and the practical histories.⁹ However, I do not consider this distinction to be useful for understanding Bacon's system of natural philosophy. The 'theoretical' model says that natural history should be a collection of facts about nature, as described in the *Parasceve* (also the *Descriptio globi intellectualis* and the *De augmentis scientiarum*). The 'practical' model is represented by the Latin natural histories, comprised in the *Historia naturalis et experimentalis*. In these writings Bacon offers a model of what a natural history should look like and, very important, they are very different from the 'theoretical' model, since they contain discussions on matter theory, are highly operative, etc. In other words, the distinction between history and philosophy is abolished in these 'practical' models, because they are composed, as I

mentioned, not only of *historia*, but also of all the other elements, which are clearly philosophical.

This difference is acknowledged by Bacon in the introduction to the *Historia naturalis et experimentalis*, where he explains why he selected these specific six titles, which are not taken from the *Catalogus* appended to the *Parasceve*, nor written according to his own indications.¹⁰ However, if this ‘justification’ had been noticed by Bacon’s scholars, there is a less known passage in the *Description globi intellectualis*, which can offer a clue on why there is such a difference between what was considered to be two different types of natural history. After giving advice how a natural history should be compiled, similar to advice found in the other works concerned with natural history, Bacon adds:

As for those Virtues which may be reckoned as Cardinal and Catholic in nature, such as Dense, Rare, Light, Heavy, Hot, Cold, Consistent, Fluid, Similar, Dissimilar, Specific, Organic and the like, together with the motions going to make them, as resistance, connection, coming together, expansion and the rest (the history of which I want absolutely to be compiled and put together, even before I come to the work of the Intellect) I shall deal with the history of these virtues and motions, and the way of putting it together, after I have finished explaining that threefold partition of Generations, Pretergenerations and Arts. For I have not, of course, included it within that threefold partition of mine, because it is not properly history but a middle term, so to speak, between history and philosophy.¹¹

As it becomes clear from this passage, what I will call from now on ‘histories of particulars’ and ‘histories of matter’ should be compiled differently. In other words, the Latin natural histories can not be the exemplification of the ‘theoretical’ model, since the model was not written for them, but for the histories of particulars. It is also relevant that Bacon had this distinction in mind since his early works, and the compiling of the histories of virtues was not a decision taken towards the end of his life. He did not change his mind, but dedicated the theoretical works to give advice for compiling histories of particulars and dedicated himself to the compiling of the histories of virtues. However, it is still clear why the histories of particulars he mentioned so many times in the theoretical writing are so important in Bacon’s general programme: they furnish material for the histories of virtues, i. e. the part called *historia*. In the remaining part of this section, I will forward arguments for why all the other elements of a natural history of matter are necessarily combined with the *historia*, and how, in this way, natural history and natural philosophy cannot be separated in the process of a scientific investigation. What the investigator of nature can do, however, is to assign the right title to each element contained in the writing, as Bacon does in the Latin natural histories.

Nevertheless, if this is the case with the Latin natural histories, then what about *Sylva*, also called a ‘natural history’? In addition to for their very different structures, another argument used by Garber to prove that *Sylva* is very different from the Latin

natural histories is their relations with the catalogue of histories appended at the end of *Parasceve*.¹² In fact, the relation between the catalogue of histories and the actual histories compiled by Bacon needs more attention. Garber's description of the list catches its cosmological structure quite well.¹³ However, there are a few remarks I would like to make supporting my initial position. The first one regards the Latin natural histories. Out of the six titles, only one of them, the *Historia vitae et mortis*, is found as such in the catalogue. The situation with the *Historia ventorum* is somewhat ambiguous. There is a *Historia ventorum, et flatuum repentinarum, et undulationum aëris* (*History of winds and of Blasts and of Undulations of the air*). However, the *Historia ventorum* seems to be more than this one, for it includes discussions about the characteristics of air in the configuration of the world and in substance. In other words, it attempts to discuss features concerning matter theory, air as one of the members of the 'two families of things', and the way in which air enters into the constitution of the world.¹⁴ In this sense, it overpasses the subject of the history listed in the catalogue and seems to comprise elements of two other histories, namely, the *Historia Aëris in Toto, sive in Configuratione Mundi* and the *Historia Aëris, in Substantia, non in Configuratione*.

The remaining four titles are just not listed among the 130 titles: *the Historia densi et rari*, the *Historia gravis et levis*, the *Historia sympathiae et antipathiae rerum* and the *Historia sulphuris, mercurij et salis*. As can be noticed, the first two are pairs of simple natures (two of the most important ones¹⁵), the third refers to the most primary relations between the particles of matter,¹⁶ and the last one to the two principles or families of things.¹⁷ In conclusion, all of these are natural histories of matter theory: either of qualities or schematisms, or of the causes of the activity of matter, or of the principles of the world. In fact, Bacon acknowledges that these histories (including the two other titles) were picked not from the *Catalogus*, but from the *Abececlarium novum naturae*.¹⁸ Thus, there appears to be tension: histories of matter can not be compiled according to the 'theoretical' model, which should include only mere observations and experiments. These histories can only be natural histories of provisional causes and explanations of phenomena. This does not mean that experiments and observations should not be included. On the contrary: the elements of matter theory Bacon wants to discover and manipulate – schematisms, forms, motions, etc. – are to be seen only in the investigation of things and processes. Thus, the historical elements are the compulsory material out of which the causal explanations, given in terms of matter theory, can be drawn. The three finished natural histories are the exemplification of this process.

The second aspect regarding the catalogue of natural histories that I would like to emphasize has to do with *Sylva*. Indeed, given its structure and title, it fits neither the list from the *Catalogus* or nor the list from the *Abececlarium*. But if we look at the individual topics, we find more than just a few equivalences. A big part of the titles of either individual experiments or groups of experiments (what Bacon calls 'experiment in consort') can be found in the *Catalogus* (especially from the history of species – metals, plants, and generations, as well as from the history of man – the histories of medicine, of sounds, of the affections, etc.), while the explanatory causes added at the end of the experiments bring into discussion the elements of matter which are the subject of the *Abececlarium*. Of course, the subjects are not developed as much as in the

Latin natural histories. In this sense, Garber is right that the particular topics need to be developed in order to become 'genuine' natural histories. What is specific, however, is that *Sylva* is not a storehouse of information. Its instances are not simple experiments and observations that could constitute the *historia* of a longer natural history. To put differently, the experiments that can be extracted from *Sylva* for placement in a natural history (similar to the Latin ones, thus a natural history of matter) would not represent the material upon which philosophy can be built, except in a few cases. The majority of instances represent bits of the philosophical parts, since these experiments contain not only descriptions of nature, but *observatio*, *canones*, *explicatio*, *mandata*, etc.¹⁹

I would like to draw some conclusions regarding the tension between the different types of Baconian natural history. Knowing that Bacon had in mind since his early writings two different types of natural histories, one of particulars and one of matter, it becomes clear that there is no real tension between the *Parasceve* and the *De augmentis scientiarum* on the one hand, and Latin natural histories comprise in the *Historia naturalis et experimentalis*, on the other. The key to understanding this divergence in his system is the distinction he draws between the histories of concrete or of particulars and the histories of abstract natures or histories of matter. Elements from the histories listed in the *Catalogus* should be taken out and put in the historical part of a work from which observations, rules, and explanations can be drawn out. This selection is not to be made according to the topics of the concrete natures, but to the abstract natures under study, as we can see in the Latin natural histories. Moreover, particulars will be used throughout the writing, because experience, according to Bacon, is the only criterion of certainty and generalizations have to be confronted with experience. However, Bacon was not interested in compiling these basic natural histories himself, but only those of abstract natures, while for the first he uses sources. And this is not only the case of the Latin histories, but, as Bacon himself stated, *Sylva sylvarum* is also superior to the natural histories of the particulars:

We leave the description of plants and their virtues to herbals, and other like books of natural history; wherein men's diligence hath been great, even to curiosity: for our experiments are only such as do ever ascend a degree to the deriving of causes and extracting of axioms; which we are not ignorant but that some both of the ancient and modern writers have also laboured; but their causes and axioms are so full of imagination, and so infected with the old received theories, as they are mere inquisitions of experience, and concoct it not.²⁰

What Bacon is saying here is that his main interest is not to compile a storehouse of facts, but to shed light upon the causes and axioms that can be extracted from them. Once again, he criticizes the existing theories of being based not on nature, but on the ideas of the corrupted mind of their authors. Nevertheless, there are natural histories that can be used as sources for his experiments that aim at theory and true knowledge of nature. In the following section I will bring into discussion Bacon's speculative and the relations with the sciences included in natural philosophy.

Baconian natural philosophy: the study of matter

In the previous section I showed why both the Latin natural histories and the posthumous *Sylva sylvarum* can not be classified as natural histories of particulars. They are not storehouses of facts. They aim a more profound knowledge of nature. The Latin natural histories are about virtues and secret processes of matter. *Sylva*, though less structured than these and discussing various topics, is very similar to the Latin natural histories. It is not only a simple description of nature. Even the description of facts is followed by provisional causal explanations.²¹ Moreover, as showed above, many of its instances do not pertain to *historia*, but to the more philosophical parts of a natural history of particulars. It is also relevant that many of the experiments are taken from sources. Though this aspect has been used as an argument for stating *Sylva*'s inferiority, I claim this is an argument to prove that Bacon was borrowing the 'raw material' from sources, with the aim of building a superior kind of natural history upon it.

In my dissertation I showed why operative natural philosophy must necessarily be included in the same process of investigation of nature. My argument was as follows: the information received from the study of individuals is theorized and provisional causes are assigned to the phenomena under study. These causes must be verified with the help of other experiments specially designed for this purpose. Of course, the level of certainty increases when the new experiments confirm the provisional theory. While extending it to more individuals through experimentation, the theory becomes more general, in the sense that it applies to a bigger number of subjects. What is important is that this 'generalization' is given in terms of matter theory – pneumatic matter, simple motions, forms, and appetites. It is the aim of this section to explain all these terms. However, in order to give explanations in terms of matter theory, and to design the new experiments that either confirm or infirm the theory, the philosopher must have knowledge of metaphysics, even a provisional one.

Of course, in some cases, the provisional rule might not work for certain individuals. If this happens, it means that the axiom remains at a lower level – that of middle axioms, and it applies only to a small number of subjects. However, what I would like to emphasize is the fact that without this trial of the provisional rules and axioms in practice, speculative philosophy could never advance. This is why operation and theory cannot be separated. In the same way, because these trials take the investigation back to particulars, natural philosophy is part of natural history. It would be impossible to establish a point when natural history becomes natural philosophy, and has no historical aspects. What is different is the very process of finding the precise subject upon which theory has to be tested and verified – this process is also based on theory. Another argument in favour of this interpretation is the fact that Bacon identifies *historia* with *experientia* and *philosophia* with *scientia*, which in turn are connected to theory.²² Given that perhaps the most important and influential idea of Bacon's philosophical system was to base theory on experience, it seems normal that the continuous intermingling of history and theory is what defines his historical and theoretical writings.²³

All this can be better understood if one connects the distinct sciences pertaining to natural philosophy with the elements of matter theory they study.

Bacon's matter theory is even more disputed among scholars than the status of natural histories. It is widely admitted that Bacon's metaphysical and speculative ideas are very puzzling. This is caused by the fragmentary and unfinished character of Bacon's works and the apparent lack of connection between the different entities he mentions when talking in terms of matter theory. My claim is that an analysis of the concepts used by Bacon to explain the causes of phenomena in different works is able to create a more compact view. When the same or similar phenomena are explained once using the appetites of matter, another time using the simple and complex motions, and another using the schematisms of matter, it becomes easy to see the connections between these entities. Thus, the picture becomes clearer if we read together the *Novum organum*, the *Abecedarium*, the *De augmentis scientiarum*, *Sylva sylvarum*, the Latin natural histories, and some of the other unpublished pieces of writings in which these entities are mentioned.

Natural philosophy has four ramifications according to Bacon depending on whether the science is either speculative or operative, and on the type of causes and processes they study. In consequence, Bacon says, physics (speculative) discovers the material and formal causes, and mechanics (operative) applies them in works, performing changes in nature. At a superior level, metaphysics (speculative) discovers the formal causes and magic (operative) applies them with the aim of radically transforming nature.²⁴ In the *Novum organum*, he claims that metaphysics discovers the form, or true difference, or the source from which a simple nature arises, while physics is given a different definition, one in relation with the processes it studies:

the discovery, in every case of generation and motion, of the latent process carried on from manifest efficient cause and manifest material cause all the way to the form implanted, and likewise the discovery of the latent schematism of bodies at rest and not in motion.²⁵

In fact, these definitions compliment each other and, by combining them, one can conclude that the investigation of nature starts with establishing the development of a body during a given processes. This development can be seen only in the changes of simple schematisms, where the picture concerning the definition of these sciences in terms of causes comes into focus. Physics investigates the material and efficient causes of all these transformations. In other words, it investigates all the visible transformations of the given body and besides which other body or process influenced the one under study in such a way as to make it change. However, physics remains limited to individual bodies. Material and efficient causes can be different and produce the same effect, or, on the contrary, can be (apparently) very different and have the same effect on a body. Bacon shows how fire and heat can produce different effects depending on the qualities of the body it works upon. In the same way, he offers several examples of very different material which have the same effect upon a given body.²⁶ Thus, physics does not go further in order to find the similarities of these processes. And this is what Bacon means when saying that physics studies the simple natures at rest: it just establishes the connection between the cause (material and efficient) and the effect, but does not grasp the inner processes of matter.

Metaphysics, by contrast, studies these changes in motion, since the form is also called *natura naturans* or “the source of which a simple nature arises”. Metaphysics gives an account of the processes taking place when a simple nature appears on a body (regardless if it is a completely simple nature or the modification of an already existing one). This ‘process’, actually the form, is identical for all the individual bodies. Compared with physics, not only is the degree of generalization higher but in metaphysics the discussion takes place at a different level: that of matter theory. When moving from physics to metaphysics, Bacon does not use only the schematisms of matter, but also simple and composed motions, forms, and appetites. How do these entities account for every natural process?

This is better understood by a case-study. In the second book of the *Novum organum*, Bacon offers an example of how the form of a simple nature (in this case the form of heat) can be discovered. What is significant for our discussion is its final definition: “the nature of which heat is a limitation is motion.”²⁷ Heat is a species of the genus ‘motion’, as Bacon says further. What differentiates heat from other simple natures (which are also species of the genus ‘motion’) are what Bacon calls ‘differences’, which “limit the motion and establish it as the form of heat.”²⁸ The form of heat is given in a sequence of simple motions and a measurement of motion, which all can be identified in the list of simple motions and measurements from both the *Novum organum* and the *Abececlarium novum naturae*.²⁹ Forms are thus sequences of simple motions, very precisely measured.³⁰

There is another link to be made here, and this will better explain the role and function of metaphysics and natural magic. Simple motions are the instruments with which matter is endowed to satisfy its appetites. Let me clarify this statement. There are four basic appetites of matter and, according to the *Abececlarium*, four simple motions correspond to each of them.³¹ When bodies want to satisfy one of these basic appetites, simple motions are activated. However, appetites cannot be the unique cause of a motion since one appetite causes more than one single motion. My claim, based on Bacon’s emphasis on ‘the given body’ upon which a simple nature can be induced, is that the forms of the existing simple natures are also essential for the superinducement of a new one. It is because of the existing motions within a body that a certain motion becomes manifest when an appetite gains the supremacy over the other three. In this way, the magician, when aspiring to superinduce a new nature, must know the ‘differences’ that create those motions, the measurements of the same, and the already existing congregations of motions in the given body (namely the forms of its simple natures). It is true that such a complete knowledge is ideal and, given the fallen mind of humankind, impossible to be attained. However, precisely because this is only an ideal, the magician is obliged to work with a provisional knowledge, which becomes more certain while producing works. This aspect is very important because it explains why for Bacon, though knowledge is required before operation, natural magic can be performed before having a ‘complete’ system of metaphysics.

Concerning operative philosophy, there is another significant distinction to be made, the difference between the mechanic and the magician. This resides in the type of knowledge each has, and in turn this difference in knowledge greatly influences the type of practical results they obtain. For the mechanic, having a superficial knowledge

of processes and of the interactions of bodies, namely their material and efficient causes (knowledge specific to physics, as discussed above), is enough. This means that it can only imitate nature, by reproducing the processes already known: a certain schematism changes on a body as the result of a certain efficient cause. The magician can also imitate nature, but, contrary to the mechanics, he can also produce more profound changes in natural bodies, by creating new artificial ones and altering natural phenomena. Even when mechanics and magic perform the same action, the magician knows which of the four appetites will be activated in the given body as a result of the interaction with another body, and to which motion or to a sequence of motions this process will give rise and lead to the change of one or more schematisms.

I consider this interaction between bodies to be fundamental for Bacon's definition of operative sciences, and the type of knowledge used by this interaction to be what differentiates mechanics and magic. In the *De augmentis scientiarum*, Bacon defines magic as "the science which applies the knowledge of hidden forms to the production of wonderful operations, and by uniting (as they say) actives with passives, displays the wonderful works of nature."³² It is this different knowledge that allows natural magic to overpass the boundaries of mere imitations. This means that magic can perform changes that were never done before, and can transfer knowledge from one domain to another. Indeed, this transfer is possible because of his metaphysical assumption that the appetites of matter are common to all the bodies in the universe.³³

This is one of the most important characteristics of magic, together with the type of knowledge it uses. In fact, these two features are interconnected. The type of knowledge based on the basic appetites of matter and simple motions is what renders the transfer of knowledge possible.

This will become clear when analysing instances from *Sylva sylvarum* and the *Historia vitae et mortis*, instances which I believe be classified as pertaining to natural magic. Again, not all the experiments in *Sylva* are magic, nor are all the instances in the *Historia vitae et mortis*. However, as I showed earlier, metaphysics and magic are necessarily included in the investigation of nature when forms, simple natures or fundamental processes represent the subject under study. Following the arguments from my dissertation, in the next section I will first shortly expose why experiments from *Sylva* contain elements of natural magic, and then I will show why the 'operative' part of the *Historia vitae et mortis* can be included in the same science.

Natural magic: *Sylva sylvarum* and the *Historia vitae et mortis*

Throughout the previous sections I hinted at showing the specific of each discipline used in the study and transformation of nature. The second section put forward the differences between natural history and natural philosophy, establishing that both the Latin natural histories and *Sylva sylvarum* should be considered more than a natural history of particulars. Consequently, being natural histories of virtues, they contain elements of natural philosophy. The third section went further and clarified the differences between physics and mechanics on the one hand and metaphysics and magic on the other. The aim of this final section is to show how several instances of *Sylva sylvarum* and the *Historia vitae et mortis* can be considered natural magic. I do not claim that all the elements of the two writings are magic, but that among their

instances one can find natural historical ones, physical and mechanical and, finally, metaphysical and magical instances.

As mentioned, the very important characteristics of metaphysics and magic are the provisional knowledge of forms and manipulation of the appetites of matter in order to create the necessary motions and the transfer of knowledge from one domain to another, transfer based on this knowledge of matter theory. These two aspects will be developed further and exemplified in the case of the two writings. For *Sylva sylvarum*, I will briefly present the arguments used in my dissertation, *From Natural History to Natural Magic: Francis Bacon's Sylva sylvarum*. This exposition of the magical elements from *Sylva* will help us to understand the way in which *the Historia vitae et mortis* share the same characteristics.

One of the reasons why *Sylva* was considered an inferior type of natural history was its extensive reliance on borrowing from other sources. Taking as an example Giambattista Della Porta's book on plants from the *Magia naturalis*, I showed that Bacon did not copy the experiments, but heavily transformed them. I identified his generalizations, the addition of causal explanation, and the methodological criticisms that define his use of this book.³⁴ Furthermore, I showed that the first two types of transformations lead to Bacon's metaphysical insight that generalizations are made according to the inner properties of bodies, while the causal explanations are given in terms of matter theory. To put it differently, while Della Porta's approach pertains to physics and mechanics, as Bacon defines them in his theoretical works, Bacon's experiments move a step forward towards metaphysics and magic. Della Porta is interested only in the efficient and material causes of individuals and in the astonishing effects that can be produced. On the contrary, Bacon's interests are the way in which it is possible to have fundamental transformations of bodies, the inner activity of matter, and the way in which the basic appetites can be manipulated.³⁵ In this regard, he is no longer at the level of physics and mechanics. It is true that in many cases he does not speak about forms or formal causes, and this might be the reason why *Sylva* was never considered to contain metaphysical and magical elements. However, in the light of Bacon's definition of form and its relation to the schematisms and the simple motions, explained in the previous section, it becomes evident that *Sylva* cannot be a mere collection of facts, nor even a book of physics and mechanics. What Bacon manipulates in *Sylva* in order to have experimental results are the basic appetites of matter. It is true that the theoretical elements are provisional causes and axioms, and thus metaphysics should also be considered provisional.

The last characteristic of magic to be found in *Sylva sylvarum* represents the transfer of knowledge from one domain to another. Because matter and its activity are identical for all the bodies in the universe, Bacon uses the results of some experiments for other groups of individuals. Of course, the transfer is not blind; the philosopher must have in mind that some beings are more complicated than others. For example, Bacon uses the results of the experiments with an earthly flame to draw conclusions about the activity of the celestial fire.³⁶ This is possible because of the metaphysical presuppositions that the appetites of matter are identical for the sublunary and the celestial worlds.³⁷ Even more, the experiments on inanimate bodies and those on plants are used for the prolongation of life. Because processes such as desiccation,

vivification, nourishment, and putrefaction are identical, this transfer of knowledge becomes possible.³⁸

Let me now turn to the *Historia vitae et mortis* and show how it shares these common features with *Sylva sylvarum*. The *Historia vitae et mortis* starts with what could be considered indeed a *historia*. These several sections either represent lists of longevity, for inanimate bodies, plants, animals and men or they study divers processes (such as desiccation, rarefaction, consumption, alimentation, etc.). It must be emphasized once again that this lists represent indeed what Bacon called *historia*; the majority of them are descriptions of facts. However, the relation between the facts and the theoretical observations on which the following operations are based is not clear at all in the majority of cases, and this contributes to the ambiguous status of this writing.³⁹ At the end of this historical part, when establishing the operations necessary for the prolongation of life, Bacon mentions the mingling of other types of instances:

But since this part on the intentions points towards practice, under the heading of history I shall mix together not only experiments and observations but also counsels, remedies, explanations of causes, assumptions, and whatever else is relevant.⁴⁰

This is the case only for the heading named ‘operations’, which are composed only by *historia*, even when they are the type of instance Bacon enumerates in the above mentioned quote, and not for the other headings *historia*, which are not operative, but more descriptive.⁴¹ In fact, it would not be an exaggeration to affirm that this natural history, in what concerns its operative part, is closer to the books of secrets, remedies, and receipts, than to the Renaissance natural histories. What is however different from this genre is the interest in theory and explanations.

As in *Sylva*, many of these operations are taken from sources.⁴² But the way in which Bacon grouped them, and the existence of such a detailed matter theory behind every single instance, define Bacon’s creativity in borrowing from sources. As I argued, in *Sylva* the creativity does not reside in being the author of an experiment, but in the very process of putting experiments together, in adding causal explanations, and in further developing experiments. I argue that the same is the case for the *Historia vitae et mortis*. The criteria according to which Bacon grouped the instances in his ten operations conducing to a long life is done according are his matter theory and his medical conceptions. Again, as well as in *Sylva* with the experiments on plants taken from Della Porta, matter theory transforms simple medical receipts into experiments of natural magic, based on provisional metaphysical axioms. First of all, Bacon has a very clear conception of the inner processes responsible for death and the necessary operations that should be performed in order to prolong life, as much as this is possible. If we have a look at each operation proposed by Bacon for the prolongation of life, we can affirm that they imply a change of one or more simple natures within the bodies under study. This is done by manipulating the appetites of matter with the help of different materials. In what follows I will offer some examples that can illustrate this point.

The first operation is on spirits, with the goal to recover their strength. Bacon explains what he means:

The spirits should be so worked on and modified that they become dense, not rare, in their substance; persistent, not biting, in their heat; their bulk should suffice for the functions of life, and not excessive, or swollen in their abundance; and steady, not twitchy or uneven in their motion.⁴³

These characteristics of the spirits can be attained through one single process: condensation. This is accomplished, according to Bacon, by four means: by putting spirits to flight, by cooling, calming or sedating them. The first action makes spirits concentrate towards the centre (the head), not letting them interact much with the surrounding tangible matter that would consume it. The second technique is the superinducement of a simple nature – that of cold. The third technique makes the spirits enjoy their own company and not want to leave the body. Put in terms of matter theory, the external influence manipulates the appetites so as to make one of them gain supremacy – in this case the appetite to enjoy their own nature triumphs over the appetite to leave the body and unite with the connaturals. The last operation has to do with inducing a certain quantity and type of motion to the spirits, this motion should be “of the kind that is robust, not biting, and likes undermining unyielding bodies rather than carrying off tenuous ones.”⁴⁴

The second operation is on the exclusion of air, because, as Bacon argues, air has similar effects upon the body as the spirit: it consumes the tangible parts. The exclusion of air has two main consequences: first, the appetite of the inner spirit to go out and unite with the connaturals is diminished if not in touch with the air and, secondly, the spirits are sent to the tangible parts and in order to make soft and tender. This exclusion is made possible by keeping the body in a cold environment, but, more effectively, if the pores of the body are closed or filled up. In other words, this operation involves a change in the pair of simple natures, porosity and compactness.

I will not analyse here all ten operations since, in respect to the relation between the techniques and the matter theory, they are very similar. The operation on the blood presupposes its cooling down, the operations on the juices of the body presupposes making them hard, fat and moist, etc. What must be mentioned is that these theoretical observations are presented at the beginning of each section, making it clear that they represent the criteria of selection for the instances of that section. This means these operations are theory-based; they do not represent the material speculative philosophy is build upon. I consider this makes the fact clear that the *Historia vitae et mortis* is closer to natural magic – science based on a metaphysical knowledge – than to a natural history – descriptions of nature upon which theory should be based. It is true that in the end Bacon gives thirty-two rules and their explanation, but they are not the result of the history. On a careful investigation, all of them are found in the previous parts of the writing, either as observations or as the theoretical pieces at the beginning of the section of operations.

The last argument I would like to introduce here is the use of models and the transfer of knowledge in the *Historia vitae et mortis*, which I mentioned to be specific to metaphysics and magic. More than in *Sylva*, the use of simplified models is obvious here. The *Historia vitae et mortis* uses knowledge resulted from the study of inanimate bodies, plants and animals in order to prolong human life. Metals and stones are inanimate bodies and models of longevity; several operations are oriented towards obtaining the same kind of characteristics in human bodies, such as hardening or softening them (such as with stones, metals or wax). Plants are models of a quick assimilation of nourishment, and as plants prosper when grafted, men should use in their alimentation the same kind of ‘concocted’ food. Bacon directly connects the longevity of animals with their specific activity and thus, the same kind of life is advised to men: not too much exercise (horses do not live long), regular life (dogs live irregularly and not much), not too much giving birth (rabbits have many children and only live a short time), etc. All this information is used for the establishment of the appropriate remedies in the case of man. Needless to say, this transfer is based on metaphysical grounds – the conviction that the appetites of matter, its simple motions and schematisms are common for all the bodies in the universe. Moreover, except for this very general conception of the universe, the Baconian metaphysician and magician needs a specialized knowledge, since at a level of complex beings and compound motions, there can appear some differences between the simple model used and the complex object for which the knowledge is used.

I hope I brought enough arguments to show why, despite their different structure and language, *Sylva sylvarum* and the *Historia vitae et mortis* are very similar. What is most relevant, they base their experiments and operations on a very sophisticated theory, which can not pertain to a natural historical investigation, nor to physics and mechanics. Nevertheless, I consider that several experiments in *Sylva* are restricted to material and efficient causes or to imitations of natural processes. Moreover, some experiments are mere descriptions of facts. In conclusion, I consider *Sylva* to be a collection of all types of instances and experiments, at all levels of knowledge in Bacon’s pyramid of sciences. Moreover, I take the *Historia vitae et mortis* to share the same characteristics, but in a very well structured and organized way. This history is about manipulating the appetites of the pneumatic matter in order to consume less tangible matter and to make the latter less predatory in relation to the former by fundamentally transforming its simple natures.

In conclusion, not only that the Latin natural histories and *Sylva sylvarum* can not be considered natural histories of particulars, compiled according to the theoretical model; they do not remain at the level of physics and mechanics either, though they contain some elements considered to be specific for these science, namely discussions on material and efficient causes. What is specific to them is the existence of discussions about forms of simple natures and the design of new experiments in which this knowledge is put into practice. This is practice is natural magic, such as Bacon desires to reform this noble science, able to bring about profound transformations of nature.

Conclusion: Salomon's House and Bacon's natural magic

By the end of his article, Dan Garber compares the structure of Salomon's House in the *New Atlantis* with the experiments in *Sylva sylvarum* and concludes that the members of Salomon's House are compiling something similar to *Sylva*.⁴⁵ In fact, the very same argument was used in my dissertation in explaining why natural magic finds a place in natural history; or, in other words, why it is impossible to establish the boundaries between the two types of investigations and transformations of nature.⁴⁶ The members of Salomon's House are reproducing the very same kind of activity Bacon used in compiling both *Sylva* and the *Historia vitae et mortis*. Taking information from natural histories, books of secrets, medical books, books of natural magic, etc., and reordering it, testing it, and theorizing upon it, they establish the metaphysical bases of the investigation of nature. Further, they verify the provisional rules and axioms and create all the astonishing objects and phenomena existing in Bensalem. Otherwise, how could they create all of these magical things since natural philosophy does not appear as such among the activity of Salomon's House? The sources they rely upon are the kind of natural histories of particulars Bacon is giving advice for their compilations. The histories left for himself are the Latin natural histories and *Sylva sylvarum*, which can be further developed and used as models for the compiling of new ones, which should cover the entire variety of phenomena and simple letters of the alphabet of nature.

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References

¹ "Drawing on passages such as expt. 93, quoted earlier, Sophie Weeks and Doina-Cristina Rusu have suggested that the *Sylva* is intended to be a treatise on natural magic. Magic, for Bacon, is the operative science that is connected with metaphysics: it is the control of nature through understanding the formal and final causes of things. There is no question that there are elements of the *Sylva* that Bacon thought of as a 'higher form' of natural magic. Rusu, for example, shows a number of ways in which in the *Sylva*, Bacon draws on the *Magia naturalis* of Della Porta, and transforms it into a kind of Baconian operative science. In this way, one can say, Bacon thought of what he was doing as a form of natural magic higher than that of which Della Porta was capable. However, there is a great deal in the *Sylva Sylvarum* that simply doesn't fit the category of natural magic, observations, experiments, travelers' tales and the like. I find it very difficult to believe that Bacon meant the entire work, or even the greater part of the work to be understood as natural magic" (Garber, D., "Merchants of Light and Mystery Men: Bacon's Last projects in Natural History", *Journal of Early Modern Studies* 3/1 (2014): 102-103. For Garber's references: Weeks, S., *Francis Bacon's Science of Magic* (unpublished Ph.D. dissertation, University of Leeds, 2007 and Rusu, D.-C., *From Natural History to Natural Magic: Francis Bacon's Sylva Sylvarum* (unpublished Ph.D. dissertation, Radboud University Nijmegen and University of Bucharest, 2013 and Bacon, F., *De augmentis scientiarum* III, 5 in *The*

Works of Francis Bacon: Baron of Verulam, Viscount St. Alban, and Lord High Chancellor of England (hereafter SEH), ed. J. Spedding, R. L. Ellis and D. D. Heath 14 vols. (London: Longman, 1857-1874). In the experiment 93 Garber mentions, Bacon states that *Sylva* is natural magic, and not natural history: “For this writing of our *Sylva Sylvarum* is (to speak properly) not natural history, but a high kind of natural magic. For it is not a description only of nature, but a breaking of nature into great and strange works” (*Sylva sylvarum*, exp. 93, SEH II, 378).

² Garber, D., (2014): 92.

³ See Rees, G., “Introduction” to Bacon, F., *Historia naturalis et experimentalis*, in *The Oxford Francis Bacon* (hereafter OFB), ed. G. Rees, L. Jardine, B. Vickers, 15 vol. planned, 8 volumes edited (Oxford: Clarendon Press; 1996), vol. XII, xxv-xxxiii. On the differences between how natural histories are described in *The Advancement of Learning*, the *De augmentis* and the *Parasceve*, see Anstey, P., “Francis Bacon and the Classification of Natural History”, *Early Science and Medicine* 17/1-2 (2012): 11-31.

⁴ Jalobeanu, D., “The Philosophy of Francis Bacon’s Natural History”, *Studii de Știință și cultură*, VI/4 (2010): 8-36.

⁵ See Giglioni, G., “*Materia and Historia*”, *Early science and medicine* 17/1-2 (2012): 62-86. Peter Urbach has a similar interpretation: there exists no clear separation between collecting facts and the inductive process of interpretation. On the contrary, Bacon’s method “will go back and forth, using observations to generate hypotheses and hypotheses to generate new observations, and even (...) to correct old ones” (Urbach, P., *Francis Bacon’s Philosophy of Science: An Account and a Reappraisal* (Illinois: Open Court, 1987), 155).

⁶ Following Bacon’s theory on the transmission of knowledge from the *De augmentis scientiarum*, in my dissertation I argue that Bacon aim at those readers who have the ability of recognizing when the experiments are connected and those who are able to advance knowledge developing Bacon’s experiments and groups of experiments. This is also the reason why Bacon uses English instead of Latin. Becoming available for everyone, some of the readers can use it with the aim of reproducing the experiments for their own benefits, while others, through this method of linking disparate experiments, can obtain a metaphysical knowledge. And this I consider to be the way in which natural philosophy should be used for the benefit of human life, as Bacon claimed more than once – even those who are not “the true sons of knowledge can benefit from philosophy, even though they will not take part in the process of the advancement of knowledge (see Rusu, D.-C., (2013), 74-82 and Bacon, F., *De augmentis scientiarum* VI, chap. II, SEH IV, 448-454).

⁷ Rawley, W., “To the reader,” in *Sylva sylvarum*, SEH II, 337.

⁸ On Bacon’s scheme of knowledge as resulting from the *De augmentis scientiarum*, see Rusu, D.-C., (2013), 264-268.

⁹ I already mentioned in the introduction some opinions about Bacon’s concept of natural history, and the tension between what Bacon says about its, and the compiled natural histories, content. For a more divers picture of Baconian natural histories, see *Early science and Medicine* 17/1-2 (2012).

¹⁰ “Since I very often lack history and experiments, especially experiments of light and crucial instances which can inform the mind about the true causes of things, I give directions for new experiments suitable, as far as I can tell at present, for the subject under inquiry. These directions are like history in embryo, for what other alternative is left to me who is just setting out on the road? I explain the ways of performing any subtler experiment in case it is flawed, and also so as to prompt others to work out better ways. I intersperse advice and cautions about the fallacies of things, and the errors and snags which may crop up in the course of inquiring and discovering, so that all spectres can as far as possible be driven off as if by

exorcism. I append my observations on the history and experiments so as to make the interpretation of nature readier. I put forward speculations and, as it were, certain imperfect attempts at the interpretation of causes; I do this sparingly, more to hint at what might be the case than to present it cut and dried. I outline and establish rules (yet only provisional ones), or imperfect axioms which crop up in the course of inquiry, and not with the intention of laying down the law. For they are useful if not altogether true. Never unmindful of utility for mankind (though light itself is more noble than what it discloses), I subjoin incentives to practice, for men's attention and memory, for I well know that such and so unfortunate is their stupidity that sometimes they do not see what is in front of their noses, but fail to notice it. I set out works and things deemed impossible, or at least so far I undiscovered which fall under the individual titles; and together with them I subjoin things already discovered and lying within human power, which are closest and most akin to those things deemed impossible and undiscovered, so that human industry may be stimulated and souls fired" (Bacon, F., *Historia naturalis et experimentalis*, OFB XII, 15-17).

¹¹ Bacon, F., *Descriptio globi intellectualis*, OFB VI, 109-111.

¹² For the list, see Bacon, F., *Parascève*, OFB XI, 474-485.

¹³ Garber, D., (2014): 93. Garber says that the way in which the list is organized resembles very well "the way in which Scholastic natural philosophy would be organized" and gives as an example Eustachius a Sancto Paulo's *Summa philosophiae quadripartite*, a very used textbook.

¹⁴ Arianna Borrelli has identified several sources of Bacon's theoretical parts of the *Historia ventorum* and showed how these are intermixed with Bacon's own conceptions. Borrelli, A., "Winds of the Late Renaissance: Some Background to Francis Bacon's 'Historia ventorum'", lecture presented at the workshop *Between Natural History and Natural Philosophy: Francis Bacon on the Investigation of Nature*, 13 December 2013, Radboud University Nijmegen.

¹⁵ For a detailed presentation of these two pairs of simple natures and their importance, see *Abecearium novum naturae*, OFB XIII, 172-73. Bacon's argument for their primacy among simple natures is the fact that they can be found in almost all bodies. Silvia Manzo has argued that dense and rare are the most fundamental simple natures and they are the key to all processes in nature, since every process represents a change of density. See Manzo, S, *Entre el atomismo y la alquimia: La teoría de la materia en Francis Bacon* (Buenos Aires: Editorial Biblos, 2006).

¹⁶ Though Bacon criticizes the magico-alchemical theory and antipathy, he does so because he considers it to be inadequate, based on false theory and superficial relations between bodies. According to him, sympathy and antipathy are the most fundamental relations between the particles of matter and the source of action, since bodies first agree or disagree and then they act consequently. Sympathy and antipathy represent the cause of the union and flight of bodies, of the mixture and separation of parts, and of the conjunction of what is active with what is passive.

¹⁷ In the introduction to this history, in the *Sylva sylvarum* and in the *Abecearium novum naturae*, Bacon presents sulphur and mercury as the two families of things, to compose every object in the world. Different from Paracelsus, who is Bacon's source in using these principles, salt is not a third principle, but a composition of the two. Sulphur and mercury are known with different terms for the mineral, vegetal and animal, spiritual and celestial spheres (see Bacon, F., *Historia sulphuris, mercurij et salis*, OFB XII, 136-139; *Sylva sylvarum*, introduction to experiment 355, SEH II, 359; *Abecearium novum naturae*, OFB XIII, 188-191).

¹⁸ At the end of the introduction to the *Historia naturalis et experimentalis*, Bacon explains his preference for these titles 'kept back for himself', which are not picked up from the Catalogue, but chosen because of other reasons: "Although at the end of the published part of my

Organum I drew up precepts concerning the Natural and Experimental History, I nevertheless think it right to describe accurately and succinctly the rule and make-up of the history which I now attempt. To the titles of the Catalogue which deal with things concrete, I add on titles relating to abstract natures (which I have mentioned as a history kept back for myself). These are the various schematisms of matter or forms of the first class, simple motions, sums of motions, measures of motions, and some other things besides. I have drawn up a *New Abecedarium* of these which I have located at the end of this volume. I have not taken the titles (since I am not up to dealing with them all) in order but I have picked some out, which are most weighty in respect of use, handiest on account of the abundance of experiments, most difficult and noble on account of the obscurity of the thing, or, on account of the differences between the titles, the ones which present the widest range by way of example” (*Historia naturalis et experimentalis*, OFB XII, 17).

¹⁹ For a classification of the type on instances Bacon used in *Sylva* and their correspondent in the Latin natural histories, see Rusu, D.-C., (2013), 86-98.

²⁰ Bacon, F., *Sylva sylvarum*, SEH II, 549-550.

²¹ Almost every ‘experiment’ in *Sylva* is followed by a provisional cause. Explaining the status of these causal explanations should be the topic of another paper. Unfortunately not much has been written on the topic. The majority of them have the aim of explaining the phenomenon in terms of the hidden activity of matter, with an accent on the appetitive nature of spiritual matter. For a very short discussion on the addition on these causes to the borrowed experiments, see Rusu, D.-C., (2013), 166-174.

²² “For I consider history and experience to be the same thing, as also philosophy and the sciences” (Bacon, F., *De augmentis scientiarum*, II, chap. I, SEH IV, 293).

²³ On this topic see Rusu, D.-C., (2013), 66-68.

²⁴ “The Inquiry of Causes I referred to the Theoretical part of Philosophy. This I subdivide into Physic and Metaphysic. It follows that the true difference between them must be drawn from the nature of the causes that they inquire into. And therefore to speak plain and go no further about, Physic inquires and handles the Material and Efficient Causes, Metaphysic the Formal and Final” (*De augmentis scientiarum* III, chap. IV, SEH IV, 346). Further, moving to the second division, he writes: “The operative doctrine concerning nature I will likewise Divide into two parts, and that by a kind of necessity. For this division is subject to the former division of the speculative doctrine; and as Physic and the Inquisition of Efficient and Material causes produces Mechanic, so Metaphysic and the inquisition of Forms Produces Magic” (Bacon, F., *De augmentis scientiarum* III, chap. V, SEH IV, 365).

²⁵ Bacon, F., *Novum organum* II, aph. 1, OFB XI, 201. Magic and mechanics are defined in a similar way: magic has as its aim to superinduce one or more natures of a given body, while mechanics should transform concrete bodies one into another.

²⁶ In the *De augmentis scientiarum*, Bacon explains that fire is the efficient cause of the hardening of clay and melting of wax (*De augmentis scientiarum* III, chap. IV, SEH IV, 346). On the other hand, the experiments in *Sylva sylvarum* are grouped according to processes. For example, in the case of vegetables salt, nitre or algae have the same effect, namely the acceleration of germination (*Sylva sylvarum* IV, SEH II, 475-479).

²⁷ Bacon, F., *Novum organum* II, aph. 20, OFB XI, 263.

²⁸ Bacon, F., *Novum organum* II, aph. 20, OFB XI, 265.

²⁹ These simple motions are the motion of spontaneous rotation, the motion of trepidation, and the measurement of time and of intensity of motion. The motions do not appear as such in the definition of the form of heat from the *Novum organum*. However, reading their definitions they can be identified with the correspondent simple motions from the above

mentioned writings. For a complete identification and a longer discussion on the topic, see Rusu, D.-C., (2013), 192-197.

³⁰ What Bacon calls the ‘measurements of motion’ are letter of the alphabet of nature, together with the schematisms, the simple and the compound motions (see *Abececlarium novum naturae*, OFB XIII, 211-215). This detail is of major importance and should open new lines of research concerning the place of mathematics in Bacon’s natural philosophy.

³¹ The list of simple motions differs from one writing to another (from the *Novum organum* to the *De augmentis scientiarum* and again to the *Abececlarium*). I am using the one from the *Abececlarium* because is the last one written by Bacon. The number of simple motions decreases from one writing to another. See *Abececlarium novum naturae*, OFB XIII, 191-203.

³² Bacon, F., *De augmentis scientiarum* IV, chap. V, SEH IV, 366-367. A very similar definition can be found in the introduction to the *Historia sympathiae et antipathiae rerum*, OFB XII, 135. In this introduction Bacon puts an emphasis on the knowledge of sympathy and antipathy for natural magic, since they are what govern the processes in nature. This is again an argument for the thesis that the Latin natural histories could not be simple natural histories, with no elements of natural philosophy. On the contrary, since the knowledge of sympathy and antipathy are required for natural magic, it becomes evident that this history would have been a book on natural magic.

³³ On the unity of Baconian matter see Rees, G., “Matter Theory: A Unifying factor in Bacon’s Natural Philosophy”, *Ambix* 24/2 (1977): 110-125; Manzo, S., (2006), Weeks, S., (2007).

³⁴ Rusu, D.-C., (2013), 139-177.

³⁵ Rusu, D.-C., (2013), 207-232.

³⁶ Bacon, F., *Sylva sylvarum* exp. 31, SEH II, 352-53. See also Jalobeanu, D., “Learning from experiment,” forthcoming.

³⁷ Bacon, F., *Description globi intellectualis*, OFB VI, 151.

³⁸ Bacon, F., *Sylva sylvarum*, exp. 58, SEH II, 363.

³⁹ As an example I will mention the major observations included in the historical part of “The nature of Durable.” After presenting ten instances on the longevity of metals, stones, vegetable, glass, bricks, liquors, etc., Bacon intermixes two observations on the nature of the spiritual matter contained in all bodies and on how it can be kept in: “1. Let us take our stand on this most certain proposition, that in every tangible thing there exists a spirit or pneumatic body hidden and enclosed in the tangible parts, and that this spirit is the source of all dissolution and consumption. Thus the antidote to these ills is to detain the spirit. 2. Spirit is detained in two ways: either by close confinement as if in a prison, or by a kind of voluntary detention. And two conditions likewise induce them to stay, namely if the spirit itself is not too mobile or sharp, and if, moreover, it is not encouraged to leave by the air outside. Thus bodies that last are of two kinds: hard and oily. The hard holds the spirit down; the oily partly calms the spirit, and partly works in such a way that it is encouraged less by the air. For air and water are consubstantial, as oil and flame are. So much then for the nature of durable and less durable in inanimate bodies” (Bacon, F., *Historia vitae et mortis*, OFB XII, 159). However, these observations will come at the end of the history as the rules of the same. The fact that they are not grounded on the previous historical part contributed to the vision of Bacon as a speculative philosopher, who used experiments to illustrate his matter theory. However, I consider this view to be inaccurate. The six natural histories seem to have continuity, and results from one are used as provisional causes, or hypothesis, in another. Thus, if the *Historia vitae et mortis* is the last one into this series, then it can use axioms from the previous histories as provisional rules for its operations (On the relation between the natural histories see Rusu,

D.-C., “Francis Bacon: Constructing Natural Histories of the Invisible”, *Early Science and Medicine* 17/1-2 (2012): 112-133.

⁴⁰ Bacon, F., *Historia vitae et mortis*, OFB XII, 245.

⁴¹ There are ten ‘operations’ conducing to a long life and except for one of them, the eight, composed of speculation (*commentatio*), all the others have only one heading – *historia*, but they indeed comprise theory, causal explanations, advice for further experimentation, etc.

⁴² On Bacon’s medical knowledge and the abundance of source in the *Historia vitae et mortis*, see Gemelli, B., “The History of Life and Death: A Spiritual History from Invisible Matter to Prolongation of Life”, *Early science and Medicine* 17/1-2(2012): 134-157 and “Francis Bacon: un riformatore del sapere tra filosofia e medicina”, *Cronos* 7/2 (2005): 227-275.

⁴³ Bacon, F., *Historia vitae et moris*, OFB XII, 247.

⁴⁴ Bacon. F., *Historia vitae et mortis*, OFB XII, 259.

⁴⁵ Garber, D., (2014): 100-102.

⁴⁶ Rusu, D.-C., (2013), 323-324.