

FRANCIS BACON AND HIS FATE IN THE HISTORY AND PHILOSOPHY OF SCIENCE, 2010–2020*

Doina-Cristina Rusu – PhD,
Postdoctoral Researcher.
University of Groningen.
PO Box 72 9700 AB Groningen,
the Netherlands;
e-mail: d.rusu@rug.nl



In this review I analyse new trends in Bacon-scholarship over the last decade. Bacon's role in the history and philosophy of science has been the topic of debate since the second half of the seventeenth century. Scholars took him to be either a key figure in the emergence of experimental sciences, or the opposite of what science is supposed to be. However, most of these bold claims were based on distortions and misunderstandings of Bacon's programme. Starting in the last couple of decades of the twentieth century, several studies offered a more nuanced account of Bacon's philosophy and tried to refute some of the 'unsound criticisms'. Moreover, over the last decade, we can notice a tendency to focus on Bacon's more practical works, and not only on the more theoretical ones.

In the context of these practical works, I identified several new trends: the role of the natural and experimental histories in the overall project of the Great Instauration, and their relation with natural philosophy; the function of mathematics and quantification; the employment of instruments and other devices to overcome the shortcomings of both the senses and the minds; the scientific methodology with an emphasis on the relation between theory and experiments, and the use of exploratory experiments; and finally Bacon's use of sources and his influence on later early modern authors. As opposed to the idea that Bacon was interested either in collecting random facts or in inventing experimental reports to present his speculative ideas, Bacon is lately portrayed as a careful experimenter, meticulous in writing reports, ingenious in designing instruments and new experiments, and critical towards his own conceptions.

Keywords: Francis Bacon, history and philosophy of science, methodology, experiment, natural history

ФРЭНСИС БЭКОН И ЕГО СУДЬБА В ИСТОРИИ И ФИЛОСОФИИ НАУКИ ПОСЛЕДНЕГО ДЕСЯТИЛЕТИЯ

Дойна-Кристина Русу –
постдок.
Университет Гронингена.
PO Box 72 9700 AB Гронинген,
Нидерланды;
e-mail: d.rusu@rug.nl

В этом обзоре я рассматриваю новые тенденции в изучении философии Бэкона в последнее десятилетие. Роль Бэкона в истории и философии науки была предметом дебатов со второй половины XVII в. Его считали либо ключевой фигурой для возникновения экспериментальных наук, либо тем, кто полностью противоположен современному научному

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исследованию. Однако большинство этих интерпретаций были основаны на непонимании программы Бэкона. Начиная с последней пары десятилетий двадцатого века исследователи предлагали более детальный подход к философии Бэкона и пытались опровергнуть некоторые из принятых взглядов. В последнее десятилетие мы также можем отметить тенденцию принимать во внимание и более практические работы Бэкона, а не только теоретические.

В этом контексте я выделяю несколько новых тем в изучении Бэкона: роль естественной и экспериментальной истории в общем проекте *Великого восстановления* и их связь с натурфилософией; функцию математики и квантификации; использование инструментов и других приспособлений для преодоления недостатков как органов чувств, так и разума; научную методологию с акцентом на связь между теорией и экспериментами, использование исследовательских экспериментов и, наконец, источники философии Бэкона, а также его влияние на более поздних авторов раннего Нового времени. В противовес идее о том, что Бэкон был заинтересован либо в сборе случайных фактов, либо в изобретении экспериментов для представления своих спекулятивных идей, в последнее время Бэкон изображается как осторожный экспериментатор, скрупулезный в написании отчетов, изобретательный в разработке инструментов и новых экспериментов, а также критически относящийся к собственным концепциям.

Ключевые слова: Фрэнсис Бэкон, история и философия науки, методология, эксперимент, естественная история

“Glorifications and denigrations continuously alternate in the history of Baconism and of Bacon’s fortunes”.

[Rossi, 1984, p. 245]

Introduction

Francis Bacon gained his place in the history of thought as the “father of experimental philosophy” and the emblematic figure of the scientific societies emerging in the second half of the seventeenth century. Bacon advocated an investigation of nature based not only on experience, but especially on interventionist experiments, and he set forth his famous inductive method, in which theory and experimentation are intertwined. In an early, unpublished manuscript, Bacon presents his motto: “To think that nobody succeeded in opening up a middle way between practical experience and unsupported theorising!” According to Bacon, he is the first one to state that theory and experience must be joined in order to gain proper knowledge of nature. Unfortunately, for a great deal of scholars, Bacon soon became a symbol of one of the two



extremes: he has been taken to be either someone who gathers practical experience unguided by theory or someone who pretended to perform ‘experiments’, but these were merely rhetorical devices to illustrate his speculative theories¹.

Analysing the main streams in the philosophy of science from the second half of the twentieth century, Paolo Rossi notices that “According to the philosophers of our century who exalted scientific knowledge, Bacon has nothing to do with science. According to the philosophers who criticized or accused scientific knowledge of many sins, Bacon was the very ‘essence’ of science. Being at variance over every philosophical problem, the two philosophical parties steadily agree on rejecting, for opposite reasons, Bacon’s philosophy” [Rossi, 1984, p. 245]. The first group refers to Neopositivists, for whom Bacon’s aim was to accumulate data and free the mind from presuppositions². The second group refers to the Frankfurt school, for whom Bacon’s utilitarian project was guilty of all those ‘sins’ science can be guilty of: materialism and mercantisation of culture, both leading to alienation and the destruction of human values. In his article, Rossi proves that Bacon was not interested in the blind accumulation of data and not in using scientific inquiry for utility only. Quite the contrary. Bacon’s aim was to combine theory and practice, and find a middle way between the superficial theorisation of the scholastics, whose theories had no correspondent in the natural world, and the blind accumulation of facts of the practitioners for whom theory was external to their work³. Despite Rossi’s convincing refutation of these oversimplified views, Bacon still did not find a place in the philosophy of science.

This might be due to yet another criticism of Bacon’s philosophy, this time coming from Thomas Kuhn. In his *Essential Tension*, Kuhn distinguishes between mathematical and experimental sciences. The latter, also called Baconian, are taken not to have had a significant impact on the development of the classical sciences, since their investigation remained strongly qualitative. Bacon’s main contribution, Kuhn thinks, was the transformation of some crafts into new scientific fields of inquiry, such as magnetism, electricity, the study of heat, or chemistry.

¹ Even Paolo Rossi, whose defence of Bacon will be discussed further, said about *Sylva sylvarum* that it is “one of the most literary and unscientific books produced in the first half of the seventeenth century” [Rossi, 2010].

² Antonio Pérez-Ramos discusses in detail and refutes the Popperian interpretation of Bacon in his chapter “Criticism of the Popperian Bacon” [Pérez-Ramos, 1988, pp. 270–285].

³ On the refutation of the idea that Bacon was interested in the accumulation of facts, and not in theory, see also Brian Vickers’ article “Francis Bacon and the Progress of Knowledge,” (1992). Vickers is engaging with Bacon scholarship not only in the history and philosophy of science, but also in literary studies, history of political thought, and philosophy of language.



However, all these fields only became proper sciences once they developed a quantitative research agenda, in other words, when they were assimilated by the mathematical tradition. Kuhn further explains the separation between classical mathematical sciences and the Baconian experimental sciences as being caused by Bacon's (and his followers') refusal to introduce mathematics and deduction into the study of nature:

Bacon himself was distrustful, not only of mathematics, but of the entire quasi-deductive structure of classical science. Those critics who ridicule him for failing to recognize the best science of his day have missed the point. He did not reject Copernicanism because he preferred the Ptolemaic system. Rather, he rejected both because he thought that no system so complex, abstract, and mathematical could contribute to either the understanding or the control of nature [Kuhn, 1977, p. 48].

According to Kuhn, Bacon thus failed at including the results of his experiments into a proper theoretical framework, in which they could be digested by mathematics and deduction. But while Kuhn emphasises the positive side of experimentalism (accuracy of the experimental reports, development of the instrumental apparatus, interventionist approach), there have been doubts whether Bacon did perform any experiments. Some thought that Bacon rather copied and adapted reports from other sources in order to illustrate his own matter theory. Even scholars who did not doubt that Bacon did perform some experiments, they still completely avoided taking into consideration Bacon's natural and experimental histories, or the experiments that can be found in the second book of the *Novum organum*. Instead, they focused on the more theoretical works. For instance, two fundamental studies on Bacon's philosophy of science, Peter Urbach's *Francis Bacon's Philosophy of Science: An Account and A Reappraisal* (1987), and Antonio Pérez-Ramos' *Francis Bacon's Idea of Science and the Maker's Knowledge Tradition* (1988) do not even list the term 'experiment' (or any of its derivatives for that matter) in their respective indexes.

I believe that the main shift in Bacon-studies over the last decade is a response to this view of Bacon. In these new studies, we find a focus on the natural and experimental histories and in particular on the experiments described in them, a focus that brings with it a reconsideration of (1) Bacon's method of induction, (2) his matter theory, and (3) the relation between experimentation on the one hand and mathematics and quantification on the other hand. In the remainder of this essay, I will focus on the scholarship published over the last decade, and the new topics that emerged in these studies.



Baconian Studies, 2010–2020

If not a lot of monographs dedicated to Bacon have been published in the last years, there has been a multitude of articles, special issues, PhD dissertations, and translations in different languages⁴. In most of these we can find a focus on the natural histories and Bacon's theory of experimentation.

In 2012, two special issues dedicated to Bacon were edited by Guido Giglioni, Dana Jalobeanu and Sorana Corneanu. The first is entitled "The Place of Natural History in Francis Bacon's Philosophy (*Early Science and Medicine* 17/1–2), the second "Francis Bacon and the medicine of the mind: Late Renaissance Contexts" (*Perspectives on Science* 20/2). In 2020, two special issues have been dedicated one to Bacon's sources – the 2020 summer issue of *Centaurus* focused on Gianbattista della Porta and Francis Bacon and their conceptions of instruments and experimentation ("Bacon and Della Porta on the Creative Power of Experimentation," *Centaurus*, edited by Doina-Cristina Rusu and Dana Jalobeanu), and one to Bacon's sources and influence, ("Baconianism in Early Modern Philosophy," edited by Dana Jalobeanu, *Journal of Early Modern Studies*, 2020).

Two collected volumes are worth being mentioned here; *Bacon et Descartes: Genèses de la modernité philosophique*, edited by Élodie Cassan (ENS Éditions, Lyon, 2014), and *Francis Bacon on Motion and Power*, edited by Guido Giglioni and James Lancaster, with Sorana Corneanu and Dana Jalobeanu (2016)⁵. I will first discuss the more general studies regarding the role played by the natural histories in Bacon's philosophy. I will then turn to the more specific issues of (1) quantification and the use of mathematics; (2) the methodological approach – which is to

⁴ See Marta Fattori's *Études sur Francis Bacon* (2012) and Dana Jalobeanu's *The Art of Experimental Natural Histories: Francis Bacon in Context* (2015). Both these books are mostly comprised of earlier publications, and thus I will not analyse them separately as books. See also Silvia Manzo, *Entre el atomismo y la alquimia. La teoría de la materia en Francis Bacon* (2006), and Chantal Jaquet's *Bacon et la promotion des savoirs* (2010). Noteworthy PhD dissertations on Bacon include Sophie Weeks, *Francis Bacon's Science of Magic* (Leeds University, 2007); Cesare Pastorino, *Weighing Experience: Francis Bacon, the Invention of the Mechanical arts, and the Emergence of Modern Experiment* (Indiana University, 2011); Doina-Cristina Rusu, *From Natural History to Natural Magic: Francis Bacon's Sylva sylvarum* (Radboud University Nijmegen and the University of Bucharest, 2013), James Lancaster, *The World's a Bubble: Francis Bacon, Nature, and the Politics of Religion* (Warburg Institute, University of London, 2015); Ünsal Çimen, *The Role of Mathematics in Francis Bacon's Natural Philosophy* (University of Otago, 2017).

⁵ An earlier but relevant special issue is "Philosophies of Technologies. Francis Bacon and his Contemporaries", edited by Claus Zittel, Gisela Engel, Romano Nanni, and Nicole C. Karafyllis, in *Intersections. Yearbook for Early Modern Studies*, vol. 11, 2008.



say the interaction between theory and experimentation –; (3) the use of instruments, the creation of exploratory experiments; and (4) Bacon’s sources and influences. In the final part, I will introduce the newly discovered manuscripts, editions, and translations of Bacon’s works.

Natural and Experimental Histories

Bacon planned to write six natural and experimental histories as the third part of his monumental project of the *Instauratio magna*. Only two out of the six were published during Bacon’s life (the *History of the Winds* and the *History of Life and Death*), while a third one appeared posthumously (the *History of Dense and Rare*). The other three were probably never written, and all we have is their short introductions published with the *Natural and Experimental History* in 1622 (these three are the *History of Heavy and Light* – of which there might have been a draft which is now lost –, the *History of Mercury, Sulphur and Salt*, and the *History of Sympathy and Antipathy*). Another natural history, the *Sylva sylvarum*, was published right after Bacon’s death and it looks more like a compilation of experiments and observations, especially when compared to the Latin natural histories, which have a clear structure and order of inquiry. In addition, the second Book of the *Novum organum* contains several experiments, given by Bacon as examples to illustrate his famous list of instances of special powers.

In the Introduction to the *Oxford Francis Bacon* containing the two histories published during Bacon’s time, Graham Rees noticed that the natural histories are a ‘hybrid’ entity, since they contained bits of theory, classifications, advice for further investigation, and even axioms – the most general theoretical scientific proposition, according to Bacon. All these entities are part of natural philosophy, which should be built on natural histories, the latter being less (if not non) theoretical. This hybrid nature has been analysed and defended in a series of articles. Dana Jalobeanu (in “The Philosophy of Francis Bacon’s Natural History”, 2010) argues that Bacon’s natural histories do not have as an aim the ordering and description of the natural world (as other natural histories of minerals, plants, and animals would have), but the description and classification of causes. This is to say that Bacon mixes what he calls ‘history’ and ‘philosophy’.

Guido Giglioni showed that natural philosophy cannot be separated from history, because reason (which corresponds to philosophy) cannot be separated from memory and senses (corresponding to history). Thinking must always have an object, and thus there is no pure thinking. In a similar vein, natural philosophy is always about objects, so there is no pure philosophy (Giglioni, “Historia et Materia. The Philosophical



Implications of Francis Bacon's natural History", 2012). Following Giglioli, Doina-Cristina Rusu argued in her PhD dissertation⁶ for the impossibility of a clear border between natural history and philosophy. She claims that, since every theoretical claim must be verified against nature, generalisations and particulars always go hand in hand. Moreover, according to her, there is no clear-cut distinction between discovery and production, nor between the disciplines ascribed by Bacon to natural philosophy. Only later can one say if a certain experiment was one of discovery or of production, whether a theoretical claim pertains to physics or metaphysics, or whether an operation is mechanical or magical. The presence of operations in the natural histories, which means that they enter the realm of operative natural philosophy, is emphasised by Benedino Gemelli, who takes as an illustration the *History of Life and Death* (in his "The *History of Life and Death*. A "Spiritual" History from Invisible Matter to the Prolongation of Life", 2012). Daniel Schwartz (in "Is Baconian Natural History Theory-Laden?", 2014) argued for a similar interpretation of Bacon's natural histories, explaining that Bacon's reliance on speculative philosophy is "unproblematic as long as he [Bacon] followed the principle of gradualism and continues to use the mechanism of enhancement and self-correction to refine, revise, and correct notions at all levels" [Schwartz, 2014, p. 88]. Differently from the previous scholars who see the mixture of natural history and natural philosophy as indissoluble, Schwartz however, considers that at a later stage, natural histories will be purified and become pure storehouses for induction.

Focusing on the tradition of mechanical histories and technical recipes, Cesare Pastorino (in "Beyond Recipes: The Baconian Natural and Experimental Histories as an Epistemic Genre", 2020) redefined Bacon's concept of natural history by showing how Bacon broke with traditions. Given that for him experimental practices were supposed to be "open ended and flexible", Bacon needed a new epistemic genre, that could accommodate his 'temporary and perfectible' experiments. His own 'natural and experimental histories' represent that epistemic genre⁷.

The relation between the Latin natural histories and the English *Sylva sylvarum* is discussed in Rusu's *From Natural History to Natural Magic* (2013), where she shows that the *Sylva* is not that different from the Latin histories, even though it lacks a rigorous structure. Her interpretation

⁶ Rusu, D.-C. *From Natural History to Natural Magic: Francis Bacon's Sylva sylvarum*. Unpublished PhD diss., Radboud University Nijmegen and the University of Bucharest (2013).

⁷ On Bacon's relation with mechanical arts, see also Pastorino's "The Philosopher and the Craftsman: Francis Bacon's Notion of Experiment and Its Debt to Early Stuart Inventors", 2017. On Bacon's relation with the recipe format, see also Jalobeanu's "Enacting recipes: Francis Bacon and Giovan Battista Della Porta on technologies, experiments and processes of nature", 2020.



received an objection from Dan Garber in his article “Merchants of Light and Mystery Men: Bacon’s Last Projects in Natural History” (2014). He claims that the differences between them are significant and they supervene on the intended audience: the Latin histories are written for experts, while the *Sylva* is a book for popularisation, written for the general public. An answer to Garber’s article, and a defence of the *Sylva*, focusing on its similarities with one of the Latin natural histories, can be found in Rusu’s “Abolishing the Borders Between Natural History and Natural Magic. Francis Bacon’s *Sylva Sylvarum* and the *Historia Vitae et Mortis*”, (2014)⁸.

Mathematics, Quantification, and Instruments

As we have seen earlier, one of the main criticisms of Bacon’s methodology was the lack of mathematisation and quantification. While it is true that Bacon holds that mathematics (as well as logic) is useful as tool for the mind, this is not the only use of mathematics. Jalobeanu has dealt with this topic in a series of articles, of which the most relevant are “The Marriage of Physics with Mathematics. Francis Bacon on Measurement, Mathematics and the Construction of Mathematical Physics” (2016), and “Experiments in the Making: Instruments and Forms of Quantification in Francis Bacon’s *Historia Densi et Rari*” (2020).

Moreover, Cesare Pastorino (especially in his “Weighing Experience: Experimental Histories and Francis Bacon’s Quantitative Program”, 2011) analysed Bacon’s experiments in relation with the mechanical arts of his time and showed, despite Thomas Kuhn’s claims, that Bacon made great use of the quantification found in these mathematical disciplines. Ünsal Çimen offers an analysis of Bacon’s attitude towards mathematics in his 2019 article “Did Francis Bacon’s attitude towards the role of mathematics in natural philosophy change between 1605 and 1623?” He concludes that mathematics has always played a central role for Bacon, as a branch of metaphysics, because quantity is one of the essential forms of things [Çimen, 2019, p. 25].

Quantification and measurements can help the study of nature, but sometimes this cannot be done without the help of instruments. For Bacon, instruments are necessary for two reasons: on the one hand human senses are too dull to notice certain aspects of nature or minute changes in phenomena, and on the other because nature is anyways subtle and even the human mind cannot always comprehend it without help.

⁸ A different defence of *Sylva*, this time based on the similarities and correspondences between the *Sylva* and the *New Atlantis* is found in David Colclough’s “‘The Materials for the Building’: Reuniting Francis Bacon’s *Sylva sylvarum* and *New Atlantis*”, 2010.



Jalobeanu, in her “Francis Bacon’s ‘Perceptive’ Instruments” (2020) describes the broader context in which certain objects are more ‘perceptive’ than the senses, and how these objects become instruments which can be used to determine and measure “natural limits, powers, and virtues”⁹. Rusu analyses the way in which Bacon uses plants as instruments for the study of living beings in “Using Instruments in the Study on Living Beings. Della Porta’s and Bacon’s Experiments with Plants” (2020). She shows that anything can be used as an instrument, and that this includes animate beings as much as inanimate beings: once some knowledge about a natural process is obtained, this knowledge can be transferred to other beings. This transfer is of course justified by the idea that natural processes are very similar even for different realms of nature.

The Role of Theory

From the previous discussion on Bacon’s natural histories, on his use of quantification and instruments, we have already gotten a more nuanced view of him as a seventeenth century natural philosopher. But one pressing question remains: what role do experiments play in Bacon? Differently put, we have seen that his natural histories are not mere collections of facts, but how is the selection made? What is the relation between theory and experimentation? There are two aspects that are relevant in the literature. One is the exploratory nature of some of Bacon’s experiments the other, inseparable from the first, is the relation between experimentation and Bacon’s matter theory.

If the natural histories are not random collections of facts, what is the criterion of selection? And how does the natural philosopher move from one experiment to another? Graham Rees contended that matter theory is the unifying factor in Bacon’s philosophy [Rees, 1977]. And we have seen above that scholars argued for the necessity of matter theory at the level of natural histories. But this should not be understood in the sense that the only function of experiments in Bacon is to verify the validity of theoretical claims. This could, of course, be one function, but Bacon’s experiments perform many others. Rusu provided a classification of several functions of experiments, with a focus on the *Sylva sylvarum*: experiments can illustrate matter theory, refute theories and experiments proposed by others, explore the properties of bodies during the development of processes, establish correlation between properties unperceived by

⁹ See also [Jalobeanu, 2016c], for how Bacon’s conception of space is defined in terms of limits and boundaries of action and force. In this context, concepts such as ‘orb of virtue’, or ‘perception’ play a fundamental role in understanding Bacon’s idea of space and extension.



the senses, and function as models of natural processes¹⁰. If the first types of experiments are intimately connected with theory (either Bacon's or his predecessors'), the last three types are what is been called 'exploratory experiments'. They start with a question or a problem, but it is not theory that guides them. On the contrary, they are directed at discovery of new theories, at establishing new correlation, and at designing new experiments which can go further in the investigation of a process.

In relation to exploratory experiments, Jalobeanu proposed a series of functions: modelling (studying on a smaller scale what cannot be studied on its normal scale), studying the same phenomenon within different domains and with different experimental set-up, and conjoining experiments that at first sight seem unrelated (see in particular "Learning from Experiment: Classification, Concept Formation and Modeling in Francis Bacon's Experimental Philosophy", 2013; and "Disciplining Experience: Francis Bacon's Experimental Series and the Art of Experimentation", 2016).

In more recent studies, Jalobeanu focused on one precise function: the formation of concepts. She traced several of these concepts in her studies on Bacon, as for example 'concoction' (in "Spirits Coming Alive", 2020) and 'rarefaction and condensation' (in "Experiments in the Making: Instruments and Forms of Quantification in Francis Bacon's *Historia Densi et Rari*", 2020). This comes down to the complex issue of the status of natural histories, and, as Jalobeanu concludes, these examples are illustrative "of the way in which Bacon seemed to believe his natural and experimental histories are supposed to work; by providing materials, models, problems, suggestions and provisional rules for the bottom-up construction of a well-defined, properly measured and exact abstract physics" [Jalobeanu, 2020c, 386–387].

Sources and Influences

If older studies on Bacon's sources were focused on Scholastic and humanist authors, and their impact on Bacon's more theoretical work, when the focus shifted towards the practical writing, we can notice a shift with respect to Bacon's sources as well. More attention is now given to Renaissance authors, such as Giambattista della Porta and Hugh Platt (see Dana Jalobeanu, "Bacon's Apples: A Case Study in Baconian Experimentation", 2016; "Enacting Recipes: Giovan Battista della Porta and Francis Bacon on Technologies, Experiments, and Processes of Nature", 2020;

¹⁰ Rusu, D.-C. *From Natural History to Natural Magic: Francis Bacon's Sylva sylvarum*. Unpublished PhD diss., Radboud University Nijmegen and the University of Bucharest (2013), pp. 104–138.



Doina-Cristina Rusu, “Rethinking *Sylva sylvarum*. Francis Bacon’s Use of Giambattista della Porta’s *Magia naturalis*”, 2017; “Using Instruments in the Study of Animate Beings. Della Porta’s and Bacon’s Experiments with Plants”, 2020; Doina-Cristina Rusu and Dana Jalobeanu, “Giovanni Battista Della Porta and Francis Bacon on the Creative Power of Experimentation”, 2020), or to practitioners, in particular of mechanical arts (see Pastorino “The Philosopher and the Craftsman: Francis Bacon’s Notion of Experiment and Its Debt to Early Stuart Inventors”, 2017).

The very same tendency can be recognised in studies concerning Bacon’s influence. Oana Matei has been investigating the reception of Bacon’s natural histories, and in Particular *Sylva sylvarum*, in later authors (see Matei, “Reconstructing *Sylva Sylvarum*. Ralph Austen’s Observations and the use of experiment”, 2017; and “Appetitive Matter and Perception in Ralph Austen’s Projects of Natural History of Plants”, 2018). Another focus has been on the dissemination of Bacon ideas outside the British Islands, in France and the Dutch Republic (see Benedino Gemelli, “Bacon in Holland: Some Evidences from Isaac Beeckman’s *Journal*”, 2014; the articles comprised in *Bacon et Descartes: Genèses de la modernité philosophique*, edited by Élodie Cassan, 2014).

Manuscripts and Editions

Since the publication by Graham Rees of *De viijs mortis, Abecedarium novum naturae*, and a draft of the *Sylva Sylvarum*, only one new manuscript has been discovered¹¹. Richard Serjeantson identified a version of the *Valerius terminus* in Oxford, with some details in Bacon’s hand, and he published it together with a commentary¹². In addition, new evidence regarding the posthumous publication of the *Sylva* by Bacon’s secretary, William Rawley, has been unearthed by Doina-Cristina Rusu and Christoph Lüthy [Rusu and Lüthy, 2017], which calls into question the

¹¹ Graham Rees assisted by Christopher Upton, *Francis Bacon’s Natural Philosophy: New Source. A transcription of manuscript Hardwick 72A with translation and commentary*, 1984; Graham Rees, “Francis Bacon’s Biological Ideas: A New Manuscript Source”, 1984; Graham Rees, “An Unpublished Manuscript by Francis Bacon: *Sylva Sylvarum* Drafts and Other Working Notes”, 1981; Graham Rees, “Bacon’s Philosophy: Some New Sources with Special Reference to the *Abecedarium Novum Naturae*”, 1984.

¹² See Richard Serjeantson, “The Philosophy of Francis Bacon, in the Early Jacobean Oxford, with an edition of an Unknown Manuscript of the ‘*Valerius terminus*’”, 2013. The publication of the manuscript was followed by two more studies of the *Valerius terminus* and its role in Bacon’s philosophy: “Francis Bacon and the ‘Interpretation of Nature’ in the Late Renaissance”, 2014, and “Francis Bacon’s *Valerius terminus* and the Voyage to the ‘Great Instauration’”, *Journal of the History of Ideas*, 2017.



compilation and publication of the text and Rawley's possible involvement with it.

One last aspect I would like to mention regards the availability of Bacon's writings. The trends in scholarship can as well be identified in translations and editions. If the *Essays*, the *Novum organum*, and the *New Atlantis* were the books usually available in several languages, over the last years new texts have been made more widely available. The Italian Edition of Bacon's scientific works contains translations of texts previously untranslated. In addition to the Latin natural histories which are part of the *Historia naturalis et experimentalis*, Bernardino Gemelli also translated short pieces left by Bacon in manuscript form, some of them which do not have any other modern edition¹³. In addition, the *Sylva sylvarum* has been translated into Romanian; and a French translation is currently being prepared, as well as its edition as part of the *Oxford Francis Bacon*.

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¹³ See Francis Bacon, *Scritti scientifici*, edited and translated by Bernardino Gemelli, with an introduction by Silvia Manzo, UTET Torino 2010.



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