FRANCIS BACON, EARLY MODERN BACONIANS, AND THE IDOLS OF BACONIAN SCHOLARSHIP

INTRODUCTORY STUDY

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Abstract. The purpose of this introductory essay is to situate some of the major questions relating to Bacon's legacy and various forms of early modern Baconianism(s) in the wider context of Bacon studies, especially in view of recent developments in this field. I claim that one can see in the troubled historical reception of Francis Bacon interesting historiographical and philosophical problems, as well as a fascinating case-study of intellectual history. I offer a way of dealing with the complexity of the field by identifying four "idols" of Baconian scholarship. I show in what ways such "idols" can be held responsible for the conflicting reception of Bacon's works and projects and for some related issues in the investigation of Bacon's legacy and "followers." I am also using these "idols" to chart a relatively little explored territory and to point towards new and recently developed directions of research. In the last part of this introductory essay I attempt a survey of themes and research questions relating to Bacon's legacy and early modern Baconianism(s) as seen from the perspective of recent developments in the field. In this way, I aim to place in a wider context the studies contained in this special issue.

Keywords: Francis Bacon, idols of Baconian scholarship, Baconianism(s), Bacon's legacy

Introduction

Francis Bacon has always held a peculiar place in the history of early modern thought. Placed on the threshold between the 'old' and the 'new,' he was successfully pictured as the first of the moderns, the last representative of Renaissance humanism;[1] the father of modern science, [2] and the last representative of a traditional 'esoteric' culture.[3] He was praised for having invented the concept of progress, [4] and criticized for his belief in the possibility of a fundamental restoration of cognitive (and moral) powers lost at the at the Fall.[5] Some scholars stressed Bacon's importance in promoting a new language (and method) of 'science,' while others emphasized Bacon's allegiance to everything the moderns despised (or feared): vitalism, anti-

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Copernicanism, (natural) magic and alchemy.[6] Such conflicting evaluations are complicated further by the fact that Bacon's works commonly overstep disciplinary divides. In addition, scholars still tend to treat Francis Bacon's works and projects in isolation from their immediate (or less immediate) contexts. To date, we have surprisingly few contextual analyses of Bacon's various achievements.

Consequently, Baconian studies have a somewhat marginal status; it is not entirely clear to which academic discipline they belong or even what historical period they deal with. Instead, Francis Bacon figure prominently in many fields: early modern thought, the study of modernity, history of philosophy, intellectual history, history of science, philosophy of science, HOPOS, cultural studies, anthropology, gender studies etc. In addition, in the past 30 years Francis Bacon was a key figure in all sorts of historical revisionisms; he was treated as an emblem, a bench-mark, a case study, for all the 'successes' and 'failures' of scientific and philosophical modernity.[7]

Bacon's legacy: a case-study in intellectual history

As it has been often remarked, few early modern philosophers have been the subject of such a wide range of conflicting interpretations; and even fewer had such a controversial philosophical legacy. The historian Stephen Beasley Linnard Penrose remarked upon the peculiarity of Bacon's reception:

> Few philosophers have suffered greater variation in the reputation which has been theirs throughout the history of modern philosophy than has Francis Bacon. Carried by eighteenth century thought to a commanding position as the "greatest, the most universal, and the most eloquent of philosophers" he was plunged in the nineteenth century to the despicable status of a man whose scientific method was never used by any real scientist, whose effect upon the advancement of science was, if anything, detrimental. From one point of view he was the first really great modern moralist; from another he was a contemptible schemer whose ethical advice had been best left unpublished. He was a staunch adherent of the Christian faith, who strengthened the hold of religion on the hearts of men; and he was a damnable atheist whose very effort was aimed at undermining all religion. He was personally a man of stainless character who was sacrificed for the misdeeds of others; and he was a treacherous designer, corrupt, immoral, "the meanest of mankind." He wrote beautiful English and admirable Latin; and his English style was stiff and pedantic, while he "knew no Latin." The only philosopher who could come close to being favorably compared with him was Aristotle, or Plato; and yet there were few men in the history of philosophy who had not made greater contribution to knowledge than had Bacon.[8]

Penrose wrote this vivid evaluation of the state of the question of Bacon's reception in 1932, but his words did not cease to ring true in the past 40 years. Quite on the contrary; changing tides in the historiography of science had produced a good

number of conflicting interpretations of Bacon's projects and achievements. Bacon was hailed as the father of modern science and the inventor of scientific method when inductivism was the dominant trend in philosophy of science. When induction, ceasing to be the 'glory of science' gained prominence as the 'scandal of philosophy,'[9] Francis Bacon became the favorite straw man in the debates over the scientific method. Even before Karl Popper and his students pictured Bacon as the 'confused and inconsistent thinker' whose "method is now only taken seriously by the most provincial and illiterate,"[10] in an article published in 1926, Morris R. Cohen gave a harsh verdict:

> Bacon's failure is most instructive because it shows the illusory character of the idea of induction which he and Mill after him made popular. According to this view, the scientist begins without any regard for previous thought. Resolved not to anticipate nature, he lets the facts record their own tale. All this is purely utopian.[11]

This image of Baconian induction as beginning with some form of naïve, non-guided procedure of fact-gathering became one standard features of the straw man all critical methodologists had to fight in the 1960s and 1970s. It proved surprisingly resistant to refutations and impermeable to textual arguments.[12] It gave historians food for thought; it also provided an impulse for further research into the distorted reception of Bacon's works. Paolo Rossi, Brian Vickers, Antonio Pérez-Ramos, Graham Rees and many others have suggested that we might have in this history of Baconian history an interesting problem for intellectual historians and philosophers. On the one hand, a history of the conflicting evaluations of Francis Bacon's achievements can give us interesting and often surprising insights into how philosophers have thought about science at a given time. [13] On the other hand, and more generally, this conflicting history of Bacon's legacy can give us insightful indications about the 'state of knowledge' at a given time. As Brian Vickers aptly put it:

> The evaluation of Bacon's work, furthermore, is a necessity to anyone interested in intellectual history, since it can act as a barometer of the state of knowledge at any one time. Since credit has traditionally been given to him for being the first to formulate the idea of progress, it is appropriate that his work can serve as a marker for the successes, and failures, of contemporary historiography in achieving a properly contextual and properly analytical understanding of a thinker from the past. His work remains, as it always been, a challenge.[14]

Rossi and Vickers agree on two points: that Bacon was often quoted without being properly read; and that even when he was read, his works were freely interpreted according to a wide range of philosophical and political agendas. Moreover, they both

emphasized the way in which Bacon's legacy fluctuated with the changing tides of historiography of science.

What Paolo Rossi, Antonio Perez-Ramos, Graham Rees and Brian Vickers have shown in their explorations of Bacon's legacy is that the large majority of writings in this field are less interested in philosophical and historical reconstructions of Bacon's projects than in promoting other agendas. Bacon's works and projects have been longtime considered simply in the light of their respective *contributions* to science, philosophy of science, modernity, progress etc. It is not surprising, therefore, that to date there are so little contextual reconstructions of Bacon's various projects; that a new, modern, scholarly edition of Francis Bacon's works is still under way;[15] that relatively little has been said and done to explore Bacon's relations with his milieu or Bacon's immediate legacy. Much of the serious investigation has been diverted by what Paolo Rossi has called 'the idols of contemporary scholarship,' i.e.: "the propensity not to read the original texts; the tendency to neglect all that happens outside our specialist community; the tendency to reduce the philosophies of the past to some seemingly brilliant slogans; the construction on these bases of mythical philosophical portraits."[16]

Meanwhile, this interpretation of Francis Bacon as simply providing a barometer for the state of learning at a given time does not explain, on the other hand, a number of constant recurrent features in the history of Bacon's legacy. For example, it does not explain the persistence, throughout the changing tides of historiography, of certain common elements, statements and prejudices, such as the alleged 'fact' that Bacon disliked and distrusted mathematics, or the widespread prejudice equating Baconian natural history with random fact gathering. It also does not fully explain a certain directional blindness; a failure to see (and sometimes read) sometimes quite large chunks of Bacon's projects, plans and preoccupations. For example, one of the latest grand-scale survey of the 'origins' of modern science simply claim that Baconian method was "never really applied either by himself or by anyone else and consequently never produced any result,"[17] or that Bacon "did not contribute much to the finding of facts in experimental way,"[18] or even that Bacon never did any experiments.

In a previous article I have suggested that one way to further our understanding is to explore the field of Bacon's legacy with an eye on the common points, recurrent prejudices and common denominators, on what I have called (following Rossi's suggestion) 'the idols of Baconian scholarship.'[19] I suggested that one can identify some relatively well defined classes of such idols: *particular*, *positive* and *recurrent* prejudices present in the large majority of contemporary evaluations of Bacon's works, regardless of their general orientation. These idols take the form of evaluative judgments of high generality. They are simple, easy to grasp, clearly stated, and equally distributed among Bacon's friends and foes. They are recurrent and remarkably persistent to the changing tides of historiography. But, most of all, they are surprisingly resistant to historical refutations.

In the next section I will summarize what I take to be the major characteristics of some of the idols of Baconian scholarship in order to show, further,

the way in which the very same idols can be seen as shaping the subsequent questions regarding the reception of Francis Bacon's thought in early modern Europe. I claim that such idols of Baconian scholarship are responsible for many blind-spots in Baconian studies. I also claim that the same idols are responsible for the directional blindness that has affected the related questions regarding Bacon's immediate influence and followers.

The idols of Baconian scholarship and the 'blind-spots' in Bacon studies[20]

One of the oldest and most entrenched idols of Baconian scholarship can be exemplified by the repeated claims that Bacon disliked and distrusted mathematics. Although fully articulated in the twentieth century, in the works of historians and philosophers of science, this idol actually originated in the seventeenth century and can often be identified in the works of Bacon's followers. In a seminal article, Kuhn made the same evaluative judgment the very root of a general classification of sciences into 'mathematical' and 'Baconian' sciences.[21] This simple claim: 'Bacon disliked mathematics' has many features of a Baconian *idola tribus*: it is a useful and widespread simplification, deeply entrenched in the received view regarding the 'nature' of science; it is based on essentialist historiographical presuppositions. It attributes 'mathematics' some a-temporal essentialist nature, disregarding completely the historical character and evolution of mathematical knowledge, mathematical disciplines and mathematical sources and authorities in the sixteenth and seventeenth centuries. Meanwhile, it has the curious persistence and resistance to refutation characteristics to the idols: not only it flies in the face of some clear Baconian claims and statements but it proves to be also remarkably resistant to refutations. A lot of ink has been spilled to refute this major idol of Baconian scholarship. Scholars have drawn attention to Bacon's own statements,[22] qualified the limits of Bacon's knowledge of mathematics,[23] qualified the historical and changing character of the 'mathematics' itself,[24] and showed how important is the quantitative aspect of mathematical knowledge for Bacon's more general 'scientific' program.[25] Despite such refutations, however, many recent discussions of Bacon's works and projects are still taken for granted Bacon's dislike of mathematics. As a result, one of the major 'blind-spots' in Bacon studies relates to Francis Bacon's theory of measurement, various quantitative aspects of Baconian natural history, the precise nature of Bacon's projected natural histories of the heavens etc. On the other hand, this idol is largely responsible for the fact that, to date, we have so little work done on Francis Bacon's readings/sources relating to astronomy, mixed (and pure) mathematics, music, etc.

The second idol of Baconian scholarship can be recognized in the recurrent claim that Bacon's science is purely speculative, that Bacon never did experiments but only mimicked the language of experimental practice to support his purely speculative system. This belief has many features in common with what Bacon has named *idola specus* (idols of the cave). It assumes a hidden agenda, an attempt to disguise and seduce by using the discourse of experimental science for mere rhetorical purposes. This idol can assume many different but slightly related forms. One is to claim that Bacon (disingenuously) borrowed ready-made observations and experimental reports

from his less-philosophically minded contemporaries and used them to serve his own purposes, namely to disguise and make more attractive an entire program of speculative philosophy. Another version of the same is to claim that Bacon elaborated a rhetorical of experimentation quite detached from experiments and experimental practices; that he was never engaged in actual experimental practice and understood little about experiments, but found clever ways to use the language and examples of experimental 'science' to attract the curious, the *virtuosi* and the *diletanti*. This second idol originates most probably in a remarkably idiosyncratic book written in the nineteenth century by a reputed chemist and experimental scientist, Justus Liebig.[26] Its persistence is however remarkable. One can find it in the works of Lynn Thorndyke and Alexandre Koyré,[27] but one can also find it in contemporary historians and philosophers.[28] One immediate result of this idol is the comparative neglect that has surrounded for a long time Bacon's natural historical writings. Even when Bacon's natural history became increasingly interesting for scholars interested in the new discipline of 'facts'[29] which eventually grounded the late seventeenth-century experimental philosophy, this second idol of Baconian scholarship proved influential and molded the quasi-universal agreement on the fact that Baconian natural history was a mere collection of miscellaneous data, with no theoretical significance and without any real experimental back-up.[30] Some effects of this blind-spot in Baconian studies propagated further, upon the related question of the immediate reception of Bacon's experiments and natural histories in the mid seventeenth-century and on the very much discussed issue of early Royal Society's Baconianism. For a long time surprisingly little has been done to explore the various readings of Bacon's natural histories during the seventeenth-century and to trace the destiny of some Baconian experiments and ideas for further experimentation. It is only in the past ten years that scholars have begun to pursue such subjects.[31]

The third idol of Baconian scholarship has some features of *idola fori*. It concerns the extremely diverse range of interpretations of what Bacon might have understood by the 'language (or alphabet) of nature'. The common point of all these interpretations is the belief that Bacon rejected mathematics (geometry) as a language of nature. Instead, he saw nature as a labyrinth and the explorer of nature as a hunter who needs to interpret the 'signs' and read the 'letters' of a complex alphabet. There are numerous and conflicting interpretations of what Bacon might have understood by this language of nature and by the subsequent *interpretatio naturae*. Many of them claim to find the sources of Bacon's interpretation of nature in previous, non-modern traditions: hermeticism,[32] natural magic,[33] the book of secrets,[34] Calvinist or Mosaic physics,[35] the humanist and rhetorical tradition of reading nature[36] etc. The multiplication of interpretative contexts does not obscure, however, the fundamental common root of all, relating again to essentialists presuppositions on the nature of mathematics as the 'language of nature' and 'mechanicism' as the trademark of modernity. Since Bacon rejected both, he must have been an exponent of an older, pre-modern tradition (hermeticism, natural magic etc.) and the Baconian 'language of nature' no more than yet another form of rejection of the mathematical and mechanical 'model' of thought associated with modern science.

The fourth idol is an idol of the theatre. It is best exemplified by the repeated claims that Bacon rejected the physico-mathematics and mechanics of Galileo (and his precursors) in order to promote a purely qualitative physics.[37] We find it at work in the persistent belief that Bacon was not interested in quantitative aspects and measurements but preferred the language of elements, appetites and the conflict between contrary qualities borrowed from Telesio and other such 'novelists.' One lasting version of this idol lies in Thomas Kuhn's long lasting divide between classical sciences and 'Baconian sciences.' For Kuhn, 'Baconian sciences' were a new 'sort of empirical science,' that developed for a while in parallel with and independently of the 'classical physical sciences.' They were characterized by a wide range of empirical activities (including early forms of experimentation) directed towards classification and investigation of new phenomena. In Kuhn's words, the practitioners of Baconian sciences:

> seldom aimed to demonstrate what was already known or to determine a detail required for the extension of existing theory. Rather they wished to see how nature would behave under previously unobserved, often previously nonexistent, circumstances. Their typical products were vast natural or experimental histories in which were amassed the miscellaneous data that many of them thought prerequisite to the construction of scientific theory.[38]

By contrast with proper mathematical sciences, Baconian natural history was often seen as consisting of miscellaneous facts and large collections of random data about nature, often obtain through purely qualitative methods of empirical investigation.[39] Much has been recently written about such Baconian natural histories (originating in Bacon's writings, or in those of his followers) in order to refute the basic elements of this fourth idol. Graham Rees and Cesare Pastorino have investigated the mathematical and quantitative aspects of Bacon's natural histories.[40] Peter Anstey and Michael Hunter have investigated the structure of order of a Baconian natural history and some of its more theoretical layers.[41] However, as the three previous idols, the idol stating the 'qualitative' character of Baconian 'science' proves durable and very resistant to refutations. It is perhaps relevant to note that even Graham Rees, the author who did most to reconstruct Bacon's 'speculative philosophy,' and who also wrote a couple of seminal papers on quantitative and mathematical aspects of Bacon's program, did not make any connections between these two aspects.[42] Such is perhaps the power of the idols: to this day, the speculative 'semi-Paracelsian' Baconian cosmology, and the more quantitative natural histories still receive completely separate treatment.

The purpose of this tentative classification is not to give a full picture of the persistent errors and prejudices in the field of Baconian studies. It is more of a preliminary attempt to understand the plethora of crude, sometimes simplistic, sometimes deeply distorted philosophical reconstructions of Bacon's project in a way Desroches characterized as bordering a 'pathology of critico-philosophical

blindness.'[43] The four idols of Baconian scholarship might contribute to a better understanding of some common key elements in the reception and evaluation of Francis Bacon's figure, works and projects. The persistence of the belief that Bacon disliked mathematics and was only interested in qualitative research can explain why relatively little has been done to disentangle the complex structure of Francis Bacon's late natural histories, his theory of measurement, his attempts to bring about the 'marriage of mathematics and physics' etc. The persistence of the idol opposing Baconian and Galilean research might be responsible for another characteristic feature of Bacon's legacy, the constant tendency to picture Bacon as a lonely figure,[44] a 'gentlemanly outsider,' equally unaware of what was going on in the intellectual effervescence of the Republic of Letters, or in the bustling world of Elizabethan artisans, naturalists and explorers.[45] In other words, the idols of Baconian scholarship are partly responsible for the non-contextual treatment received by Bacon's writings.
It is, I think, important to notice that every refutation of the four idols has brought about remarkable new findings and insights in the field of Baconian studies. As a result, scholars have become increasingly aware of the necessity of a thorough exploration of Bacon's works in context. Further explorations into this matter will contribute to an increased clarification of other vexing issues, such as the intricate insufficiently explored problem of Bacons sources, and the troublesome question of Bacon's reception, the much debated issue of seventeenth century Baconianism.

Philosophical reconstruction: 'the man without followers'

Nowhere is the image of Bacon, the lonely genius, the man without followers, more prominent than in the Victorian edition of works and letters put together with James Spedding, Robert Leslie Elis and Douglas Heath. The fourteenth volumes of works and letters are telling a 'tragic history'[46] of a triple failure: political, scientific, and moral. Sppeding's Bacon is the hard working administrator and political advisor who nevertheless could not get the support of the two monarchs he faithfully served all his life; the lonely philosopher who could not persuade anyone that his grand-scale plan for the reformation of knowledge is of any value whatsoever;[47] and the 'deeply sensitive' and highly moral human being who nevertheless left a scattered inheritance and whose 'troubles' continued even after his death.[48] Bacon's scattered manuscripts, claimed Spedding, were eventually published "too long indeed after date to be justly appreciated by a new generation in an altered world, and not before many had gone abroad in imperfect shape."[49] As a result, not only that there were no true Baconians in the seventeenth-century but, according to Spedding, no one has ever attempted to continue Bacon's program for the reformation of learning.

> what have they done with this work since he left it? There is lies to speak for itself, sticking in the middle of the *Novum Organum*. No attempt has been made, that I can hear of, to carry it out further. People seem hardly to know that it is not complete. John Mill observes that Bacon's method of inductive logic is defective, but does not advert to the fact that of *ten* separate processes which it was designed to include, the first only has to be

> explained. The other nine he had in his head, but did not live to set down more of them than the names. And the particular example which he has left of an inductive inquiry does not profess to be carried beyond the first stage of generalization, - the *vindemiatio prima* as he calls it.[50]

What is striking in Spedding's reconstruction of Bacon's project is in how many points it is insightful and accurate. Unlike many of his contemporaries, Spedding accurately describes the shift of emphasis in Bacon's project from the method of the *Novum Organum* to the method of 'Natural History.'[51] He accurately describes the natural historical project as a methodological, grand-scale approach to finding the 'alphabet of nature.' This reconstruction is, however, distorted by the claim that Bacon's vision of experimental work was simplistic, uninformed, detached from the scientific achievements of the day, that his natural histories dealt with curiosities and natural magic, that Bacon did not really perform experiments, that natural history was designed to be a "dictionary or index of nature… nearly as voluminous as Nature itself."[52]

Lisa Jardine and Alan Stewart have shown in the past years how the romantic image of Bacon 'the lonely genius' has lead James Spedding to make certain biased editorial choices. For example, Spedding did not include in his edition of Bacon's correspondence letters referring to Bacon's relations with his more 'scientifically-minded' contemporaries, such as Kepler and Galileo.[53] A vivid illustration of the ways in which the idols of Baconian scholarship can distort a thorough and painstaking editorial effort can be found in the ways Spedding and Ellis have handled the editing of Francis posthumous *Sylva Sylvarum*. A serious work of investigation into the sources of Bacon's *Sylva Sylvarum* was undermined by the current set of prejudices regarding Bacon's miscellaneous 'collections' of natural historical facts, his lack of originality, the fact that he did not actually performed sophisticated experimentation etc. As a result, *Sylva* was classified as belonging to the tradition of 'popular' books of curiosities, natural magic and secrets. Ellis and Spedding also claim that "in truth, a considerable part of it is copied from the most celebrated book of the kind, namely Porta's *Natural Magic*."[54] By contrast, Graham Rees has shown in a seminal article that many of *Sylva*'s 'experiments' are 'complex, multi-faceted entities,' originating not only in books but also in Bacon's own 'observational and experimental work.'[55] Moreover, by comparing the published text with an existing manuscript, Rees has shown that "there can be no question of Bacon trying to pass off second-hand material as his own," that Bacon was "particularly fastidious about signaling borrowed material."[56] Much more work needs to be done, not only on Bacon's posthumous *Sylva Sylvarum* but also on his earlier Latin natural histories, in order to unearth and clarify the multi-faceted concept of Baconian experimentation and the complexities of what Bacon has called 'natural and experimental history'. Attempts to do precisely this have multiplied in the past couple of years. After being buried for three hundred years in almost complete oblivion, Francis Bacon's natural histories are again subject of close scrutiny. From the relatively little that has been done so far it is already clear that this is a very promising field for historians and philosophers alike. The contextual investigation of

Bacon's natural history has shown, for example, the richness of their sources, the critical and creative way in which Bacon dealt with these sources, the multi-layered theoretical aspects of natural and experimental history etc.[57] In addition, as shown by Charles Webster, Lisa Jardine, Cesare Pastorino and E.A. Ash, when discussing Bacon's sources, one needs to explore not only the bookish culture of the Republic of Letters, but also the 'scientific and technological knowledge' of late sixteenth and early seventeenth-century. [58]

A different trend of contextual investigations has tried to place Bacon's natural historical works in relation with his legal, political and historical writings. Silvia Manzo has discussed the interesting parallels between Bacon's natural and political history, Julian Martin and Richard Serjeantson have investigated ways in which elements of Bacon's legal vocabulary and methodology have informed his natural philosophy.[59] Substantial work has also been devoted to the complex relation of natural history, natural philosophy, abstract physics and metaphysics in Bacon's late writings.

By contrast to the Victorian edition, the new edition of Bacon's works, *The Oxford Francis Bacon* is painting the portrait of a very different philosopher – much more immersed in the intellectual, philosophical and scientific context of his day. However, much remains to be done even in this modern and in many ways groundbreaking editions. Its volumes differ greatly in handling the problem of Bacon's sources; and in some cases, particularly in the natural historical works, the contextual investigation is merely suggested as work to be done in the future.

Meanwhile, although we have learned more about Bacon's sources, elements of the Victorian image of the 'lonely philosopher' still loom in the secondary literature on Baconianism. The same conflicting and ambivalent image originating in the 'idolatrous' reading of Bacon's projects plagues the field of Bacon's legacy. There is a wide range of conflicting evaluations on the vexing questions of seventeenth-century Baconianism. Some see Baconians everywhere; some claim that Bacon had no disciples and no faithful followers. In between there is a wide array of opinions, disagreeing quite substantially on the minimal description they attach to 'Baconianism.'

Forms of Baconian inheritance

'The man without followers' was extremely popular in the second part of the seventeenth century. But this popularity came in so many forms that it made seventeenth-century Baconianism a very complex and very problematic subject. In Graham Rees vivid description:

> In seventeenth-century England Bacon's writings were invoked by virtuosi on the make, provincial projectors, improving colonialists, millenarian visionaries, royalists and radicals, Anglicans and Puritans, Calvinists and Latitudinarians, educational and social reformers, promoters of the New Science and defenders of the Old Erudition. The great figures of the Royal Society were as keen to associate themselves with his programme as were

> many lesser figures who, as self-interest or philanthropy prompted, flocked to the noble but ambiguous banner of the Experimental Philosophy. That, at any rate, was true of England, from the early 1640s. But before that Bacon's reputation was perhaps greater in Europe, and various brands of continental Baconianism were subsequently reimported to help shape the emergent home-grown Baconianism of Britain.[60]

There were many forms of Baconianism in the seventeenth-century Europe. They were also very diverse. Hugh Trevor Ropper and Charles Webster tended to classify them in 'high' and 'low' forms of Baconianism.[61] The latter was to be found chiefly in the pamphlets and manifestoes of the social reformers. The first was a 'natural philosophical' and methodological form of Baconianism more difficult to pinpoint and varying from one author to the other.[62] In his investigations of the origins and history of the early Royal Society, Michael Hunter has claimed that the label 'Baconian' was largely ideological; it was conceived as a 'common ground' of consensus among the debates and disputes of the 1660s and 1670s.[63] Similarly, Michel Malherbe has claimed that the experimental Baconianism of the Royal Society was mainly an ideological weapon in the war between the virtuosi and Thomas Hobbes.[64] By contrast, Guido Gilioni has shown that Bacon was seriously read and sometimes closely followed; only that that did not necessarily happened in the camp of the 'winners,' but in that of the 'losers' of the Scientific Revolution. According to Giglioni, it is in the works Samuel Hartlib and John Dury, Jan Amos Comenius and Francis Glisson that one can find the strongest influence of Bacon's theories and ideas. However, as Giglioni also emphasizes, much remains to be done in the field of 'seventeenth-century Baconianism,' where, "Bacon's natural philosophy met the favorable response of various 'universes of expectations.' Most of all, his work provided a new language to voice concerns on natural knowledge at the time."[65]

No doubt, the contextual re-evaluation of Francis Bacon's various projects for the advancement of learning will soon have a serious impact upon the field of Baconianism. In many ways, this investigation will have to start afresh, adding new questions to the traditional issues discussed in the secondary literature. So far, the debates were confined to the *reasons* for being Baconian; sometimes to the exploration of political, theological and philosophical *presuppositions* behind the adoption of Baconianism. Much more needs to be done, at the level of sources, ways of transmissions and ways of interpretation at work in various forms of Baconianism. One way to do this is to consider the extent to which various forms of seventeenth century Baconianism are *historico-philosophical reconstructions*, based on a corpus of (fragmentary and fragmented) writings. A thorough investigation of seventeenth-century editions of Bacon's works and European diffusion is still missing. A parallel investigation into ways of reading Bacon's texts in the second part of the seventeenth century is also necessary.

Recent developments in this field have proposed consistent re-evaluation of key concepts and themes relevant for both Bacon studies and various forms of early modern Baconianism. Important developments in the field of natural history,

experimentalism, prerogative instances, the relation between natural history, natural philosophy and natural magic,[66] explorations of Bacon's notions of appetites,[67] alphabet of nature, *experientia literata*, explorations into the intricate relations between Bacon's moral and medical writings and his natural philosophical works,[68] his key-concept of *medicina mentis*,[69] his views on human faculties, imagination[70], etc., have opened up new directions of study into the mid and late seventeenth-century forms of Baconianism. Other recent investigations have revisited questions such as: the reception of Bacon's writings in France and Holland and the relations between Bacon and Gassendi,[71] Mersenne[72] or Descartes.[73] Much more needs to be done, however, before we have an accurate picture of Bacon in context and before we can draw the complex and intricate map of Bacon's intellectual legacy to Early Modern Europe.

The purpose of this volume is to investigate some specific elements of Baconian legacy, adding to the existing (and growing) corpus of literature on the subject. It does not aim to provide a full and comprehensive picture of this relatively new field of studies. Its aim is, rather, to open up directions for further research by revisiting well established but insufficiently explored questions, such as the posterity of the celebrated Baconian 'crucial instances,' or by asking precise questions regarding the ways in which various elements of Bacon's projects for building up natural histories were received and developed in the mid or late seventeenth-century England. It also addresses a couple of questions relating more precisely to insufficiently investigated concepts and ideas, such as Bacon's rather mysterious but recurrent notion of 'potential heat.' The major contribution of this present volume is at the level of 'first vintage' (to use a Baconian vocabulary): it aims to take stock of recent trends in Bacon's studies and to apply their results in the contextual study of early modern forms of Baconian inheritance.

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[1] Although the study of Bacon's project in context is still relatively under-developed, there were quite a number of attempts to embed such studies in the larger context(s) of Renaissance humanism. The latter is, however, a field under (re)construction, which means that quite a lot needs to be done in order to have a fine-grained picture of Bacon's indebtedness and eventual departure from a humanist culture. Important work in this direction has been done in some of the following works: Pérez-Ramos, A., *Francis Bacon's Idea of Science and the Maker's Knowledge*

Tradition (Oxford: Oxford University Press, 1988); Sargent, R. M., "Francis Bacon and the Humanistic Apects of Modernity", *Midwest Studies in Philosophy* 26 (2002):124; Jardine, L. A., *Francis Bacon, Discovery and the Art of Discourse* (London: Cambridge University Press, 1974); Jardine, L. and Stewart, A., *Hostage to Fortune: The Troubled Life of Francis Bacon* (London: Phoenix Giant, 1999); Jardine, L., "Revisiting Rossi on Francis Bacon: hands-on science", in *Advancement of Learning. Essays in Honour of Paolo Rossi*, ed. J. H. Heilbron (Firenze: Leo S. Olski, 2007): 59-77; Serjeantson, R., "Testimony and Proof in Early Modern England", *Studies in History and Philosophy of Science* 30 (1999):195-236; Serjeantson, R., "Francis Bacon and the Interpretation of Nature in the Late Renaissance", *ISIS* (2013 forthcoming); Corneanu, S., Giglioni, G., and Jalobeanu, D., eds., "Francis Bacon and the Transformation of Early Modern Natural History", 1-2 vols., *Early Science and Medicine* 17 (2012).

[2] Francis Bacon "the Father of modern science" is a common topic in the eighteenth and nineteenth centuries. For a discussion see Rees, G., "Reflections upon the reputation of Francis Bacon's philosophy", *Huntington Library Quarterly* 65 (2002):379-94; Pérez-Ramos, A., "Francis Bacon and the Disputations of the Learned", *British Journal for the Philosophy of Science* 42 (1991):577-88. What is less discussed is that there is another significant direction of research in the nineteenth century, attributing to Bacon the "invention" of natural philosophy. For example, according to John Herschel, "Previous to the publication of *Novum organum* of Bacon, natural philosophy, in any legitimate and extensive sense of the word, could hardly have said to exist." Herschel, J. F. W., *Preliminary discourse on the study of natural philosophy ... New edition* (London: Longman, Brown, Green & Longmans, 1851), 105. See also Tyler, S. and Bacon, F., *A discourse of the Baconian philosophy* (Frederick City, Md.: D. Schley & T. Haller, 1846), 47.

[3] This is rather a crude way to unify quite different attempts to place Francis Bacon in the tradition of natural magic, hermetic philosophy, the tradition of secrets, various attempts to recuperate a *prisca theologia* or a *prisca philosophia* etc. For a sample of such writings see Rossi, P., *Francis Bacon: From Magic to Science* [Francesco Bacone: Dalla magia alla scienza] (London: Routledge and Keagan Paul, 1968); Eamon, W., *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture* (Princeton: Princeton University Press, 1994); Yates, F. A., *The Occult Philosophy in the Elizabethan Age* (London; Boston: Routledge & K. Paul, 1979); Yates, F. A., *The Rosicrucian Enlightenment* (London, Boston: Routledge and Kegan Paul, 1972).

[4] There are many studies exploring Bacon's notion of progress and the impact of his conception of progress upon early modern thought. See for example Faulkner, R. K., *Francis Bacon and the Project of Progress* (Rowman & Littlefield, 1993); Leary, J. E., *Francis Bacon and the Politics of Science* (Ames: Iowa State University Press, 1994).

[5] There are many ways in which scholars have attempted to read Bacon's claims regarding the restorative powers of the Great Instauration. See for example the conflicting views of Harrison, P., *The Fall of Man and the Foundations of Science* (Cambridge: Cambridge University Press, 2007); Harrison, P., "Reinterpreting Nature in Early modern Europe: Natural Philosophy, Biblical Exegesis and the Contemplative Life", in *The Word and the World: Biblical Exegesis and Early Modern Europe*, ed. K. Killeen and P. J. Forshaw (Palgrave: Macmillan, 2007): 25-44; Bono, J. J., *The Word of God and the Languages of Man : Interpreting Nature in Early Modern Science and Medicine* (Madison; London: University of Wisconsin Press, 1995); Webster, C., *The Great Instauration: Science, Medicine and Reform 1626-1660* (London: Duckworth, 1976).

[6] In Alexandre Koyré harsh evaluative claim: "Bacon, "the founder of modern science" is a joke, and a bad one at that, that one can still find in the text books. In fact Bacon understood nothing about science. He was credulous and completely uncritical. His manner of thinking was closer to alchemy and magic (he believed in "sympathies"), in short to that of a primitive

or to a thinker of the Renaissance than to that of Galileo or even a Scholastic." Koyre, A., *Galileo Studies* (Atlantic Highlands: Humanities Press ; [Hassocks] : Harvester Press, 1978), 38.

[7] In the vivid words of Nieves Mathews: "The most widespread misattribution is that of the false prophet who led humanity, not to the promised land, but to the wilderness of rank materialism and crass utilitarianism. All the ills of industrialization, from soil erosion and the fumes of car exhausts to the loss of human values in an alienated consumer society, have been laid at Bacon's door, and he was denounced by Heidegger and Marcuse as the evil animus of science, a very symbol of its "nefarious identification" with technology. At a time when people had begun to feel the damaging effects of industrial development, who better fitted than the author of the *New Atlantis* for the role of scapegoat so often awarded him? The deposed father of experimental science became its wicked stepfather." See Mathews, N., *Francis Bacon: The History of a Character Assassination* (New Haven, Conn.; London: Yale University Press, 1996), 409-10.

[8] Penrose, S. B. L. t. E., *The Reputation and Influence of Francis Bacon in the Seventeenth Century* (New York, 1934), 1-2.

[9] It is highly relevant to remember that the famous quote of C.D. Broad originated in an address delivered at Cambridge on 5 October 1926 on the occasion of Bacon's tercentenary. It reads thus: There is a skeleton in the cupboard of Inductive Logic, which Bacon never suspected and Hume first exposed to view. Kant conducted the most elaborate funeral in history, and called Heaven and Earth and the Noumena under the Earth to witness that the skeleton was finally disposed of. But, when the dust of the funeral procession had subsided and the last strains of the Transcendental Organ had died away, the coffin was found to be empty and the skeleton in its old place. Mill discretely closed the door of the cupboard, and with infinite tact turned the conversation into more cheerful channels. Mr Johnson and Mr Keynes may fairly be said to have reduced the skeleton to the dimensions of a mere skull. But that obstinate *caput mortuum* still awaits the undertaker who will give it Christian burial. May we venture to hope that when Bacon's next centenary is celebrated the great work which he set going will be completed; and that Inductive Reasoning, which has long been the glory of Science, will have ceased to be the scandal of Philosophy?" See Broad, C. D., *The philosophy of Francis Bacon* (Cambridge: Cambridge University Press, 1926). An electronic version of the text at: http://www.ditext.com/broad/bacon.html.

[10] Lakatos, I., Worrall, J., and Currie, G., *Philosophical papers : Vol 2: Mathematics, Science and Epistemology* (Cambridge: Cambridge University Press, 1978), 129.

[11] See Cohen, M. R., "The Myth about Francis Bacon and Inductive Method", *Scientific Monthly* 13 (1926):504-8. Also quoted in Pérez-Ramos, A., (1988), 28.

[12] One of the most comprehensive refutations has been formulated by Paolo Rossi. See Rossi, P., "Ants, Spiders, Epistemologists", in *Terminologia e fortuna nell XVII secolo*, ed. M. Fattori (Rome: Edizzione del' Ateneo, 1984): 245-60.

[13] Rossi, P., (1984), 247.

[14] Vickers, B., "Francis Bacon and the Progress of Knowledge", *Journal of the History of Ideas* 53 (1992):495-508, 518.

[15] Seven volumes of the fourteenth-volumes *Oxford Francis Bacon* edition have been published so far. One can hope that in a couple of years students of Bacon's works will have a new authoritative edition of philosophical works. For Bacon's professional works and for his correspondence the reader is still depending on the Victorian edition of James Spedding, Robert Leslie Ellis and Douglas Dennon Heath.

[16] Rossi, P., (1984), 259.

[17] The evaluation belongs to Dijksterhuis, *The Mechanization of the World Picture* (1964); see Zagorin, P., *Francis Bacon* (Princeton, N.J.: Princeton University Press, 1998), 126.
[18] Cohen, H. F., *How Modern Science Came into the World : Four Civilizations, One 17th-century Breakthrough* (Amsterdam: Amsterdam University Press, 2010), 247.
[19] Jalobeanu, D., "The Four Idols of Baconian Scholarship", *Procedia - Social and Behavioural Sciences* 71 (2013):123-30.
[20] This section is summarizing work done in Jalobeanu, D., *The Hunt of Pan: Francis Bacon's Art of Experimentation and the Invention of Science* (Bucuresti: Zeta Books, 2014 (forthcoming)); Jalobeanu, D., "The Four Idols of Baconian Scholarship."
[21] Kuhn, T., "Mathematical versus Experimental Traditions in the Development of Physical Science", in *The Essential Tension. Selected Studies in Scientific Tradition and Change* (Chicago: University of Chicago Press, 1977): 31-65.
[22] Such as the repeated claims that "the marriage of mathematics with physics begets practice," Bacon, F., *The Instauratio magna. Part 2, Novum organum and associated texts*, ed. G. Rees and M. Wakely, vol. XI, The Oxford Francis Bacon (Oxford: Clarendon Press, 2004), 464.
[23] See for example my forthcoming paper Dana Jalobeanu, "'The marriage between mathematics and physics:' Francis Bacon's theory of measurement and the four idols of Baconian scholarship," in *The Language of Nature*, special issue of *Minessotta Studies in Philosophy of Science*, forthcoming (2014). See also Rees, G., "Mathematics and Francis Bacon's Natural Philosophy", *Revue internationale de philosophie* 40 (1986):399-427.
[24] A number of recent studies have qualified the historical evolution and substantial transformation suffered by mathematical knowledge in the English renaissance. See for example Goulding, R., *Defending Hypatia : Ramus, Savile and the Renaissance rediscovery of mathematical history* (Dordrecht: Springer, 2010); Ash, E. H., *Power, Knowledge, and Expertise in Elizabethan England* (Baltimore and London: John Hopkins University Press, 2004); Pumfrey, S., "'Your astronomers and ours differ exceedingly': the controversy over the 'new star' of 1572 in the light of a newly discovered text by Thomas Digges", *British Journal for the History of Science* 44 (2011): 29-60.
[25] Rees, G., "Quantitative Reasoning in Francis Bacon's Natural Philosophy", *Nouvelles de la republique de letttres* 1 (1985):27-48; Pastorino, C., "Weighing Experience: Experimental Histories and Francis Bacon's Quantitative Program", *Early Science and Medicine* 16 (2011):542-70.
[26] I have discussed Liebig's reconstruction of Bacon in Jalobeanu, D., "The Four Idols of Baconian Scholarship." See also Liebig, J. F. v. et al., *Lord Bacon par J. de Liebig, traduit de l'Allemand par P. de Tchihatchef* (Paris, 1866); Liebig, J. F. v. and Bacon, F. A. C., *Ueber Francis Bacon von Verulam und die Methode der Naturforschung* (München, 1863).
[27] Koyre, A., *Etudes d'histoire de la pensée scientifique* (Paris: PUF, 1966).
[28] See for example Deborah Harkness recent book, where Bacon is accused of plagiarizing one of his contemporaries, Hugh Platt. Harkness, D. E., *The Jewel house: Elizabethan London and the Scientific Revolution* (New Haven and London: Yale University Press, 2007). For a different kind of evaluation also indebted to the belief that the topic of Baconian experimentation is mainly a rhetorical topos see Malherbe, M., "L'induction baconiene: de l'echec metaphysique a l'echec logique", in *Francis Bacon: Terminologia e fortuna*, ed. M. Fattori (Rome: Edizzioni del Ateneo, 1984): 179-200; Deleule, D., "Experientia-Experimentum ou le mythe du culte de l'experience chez Fracis Bacon", in *Francis Bacon: Terminologia e fortuna*, ed. M. Fattori (Rome Edizzioni del Ateneo, 1984): 59-72.
[29] Shapiro, B., *A Culture of Fact: England, 1550-1720* (Ithaca: Cornell University Press, 2000); Shapiro, B., "Testimony and Probability in seventeenth-century English natural philosophy: Legal origins and early development", *Studies in History and Philosophy of Science* 33 (2002):243-63;

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[30] Findlen, P., "Natural History", in *The Cambridge History of Science. Volume 3: Early Modern Science*, ed. L. Daston and K. Park (Cambridge: Cambridge University Press, 2006): 435-69; Findlen, P., "Francis Bacon and the Reform of Natural History in the Seventeenth Century", in *History and the Disciplines: The Reclassification of Knowledge in Early Modern Europe*, ed. D. R. Kelley (Rochester: University of Rochester Press, 1995), 239-61; Daston, L., "Baconian facts, Academic Civility, and the Prehistory of Objectivity", *Annals of Scholarship* 8 (1991):337-63.

[31] I will discuss this issue further in the next section of this paper.

[32] Hattaway, M., "Bacon and the *Knowledge Broken*: Limits for Scientific Method", *Journal of the History of Ideas* 39 (1978):183-97.

[33] In fact, the interesting relation between Bacon's writings and the natural magic tradition was never properly and accurately investigated, despite the interesting beginning proposed by Paolo Rossi more than half a century ago. See Rossi, P., (1968).

[34] Eamon, W., (1994).

[35] Harrison, P., (2007); Harrison, P., in K. Killeen and P. J. Forshaw, (2007).

[36] Lewis, R., "Francis Bacon, Allegory and the Uses of Myth", *Review of English Studies* 61 (2010):360-89; Lewis, R., "A Kind of Sagacity: Francis Bacon, the *ars memoriae* and the Pursuit of Natural Knowledge", *Intellectual History Review* 19 (2009):155-77.

[37] See for example the following critical evaluation of Alfred North Whitehead: "In this respect Bacon completely missed the tonality which lay behind the success of seventeenth-century science. Science was becoming, and has remained, primarily quantitative. Search for measurable elements among your phenomena, and then search for relations between these measures of physical quantities. Bacon ignores this rule of science…. He gives no hint that there should be a search for quantities." See Desroches, D., *Francis Bacon and the Limits of Scientific Knowledge* (London: Continuum, 2006), 36-7.

[38] Kuhn, T., (1977): 43.

[39] Findlen, P., (2006); (1995).

[40] Pastorino, C., (2011); Rees, G., (1986); Rees, G., (1985).

[41] Anstey, P. and Vanzo, A., "The Origins of Early Modern Experimental Philosophy", *Intellectual History Review* 22 (2012):499-518; Anstey, P. and Hunter, M., "Robert Boyle's Designe about Natural History", *Early Science and Medicine* 13 (2008):83-126. See also Jalobeanu, D., "Core Experiments, Natural Histories and the Art of *experientia literata*: the meaning of Baconian Experimentation", *Societate si Politica* 5 (2011):88-104; Jalobeanu, D., "The Philosophy of Francis Bacon's Natural History: A Research Program", *Studii de stiinta si cultura* 4 (2010):18-37.

[42] In many places Graham Rees suggests that such a connection is not only possible but necessary, but that it is work for the future. See Rees, G., (1985); (1986); Rees, G., "Matter Theory: A Unifying Factor in Bacon's Natural Philosophy", *Ambix* 24 (1977):110-25; Rees, G., "Francis Bacon's Semi-Paracelsian Cosmology and the Great Instauration", *Ambix* 22 (1975):161-73; Rees, G., "Francis Bacon Semi-Paracelsian Cosmology", *Ambix* 22 (1975):81-101; Rees, G., "Francis Bacon's Speculative Philosophy", in *Cambridge Companion to Bacon*, ed. M. Peltonen (Cambridge: Cambridge University Press, 1996): 121-45.

[43] Desroches, D.,(2006), 148.

[44] Bacon, F., *The Works of Francis Bacon: Baron of Verulam, Viscount St. Alban, and Lord High Chancellor of England*, ed. J. Spedding, R. L. Ellis, and D. D. Heath, 14 vols. (London: Longman, 1857-1874), vol III, 508-11.

[45] This is the thesis of Deborah Harkness in Harkness, D. E., (2007).

[46] Bacon, F., *Works*, vol. XIV, 554.
[47] It is interesting to note that Spedding was personally persuaded of the high philosophical value of Bacon's grand-scale plan and thought that the real cause of the failure was that Bacon didn't have enough time to work out its details. In numerous evaluative passages throughout his edition, Spedding offers a very interesting dual reconstruction of Bacon's program, as interesting, novel and promising, but suffering from begin detached from the science of his day, insufficiently aligned with the progress of mathematics, astronomy, physics etc. All four idols of Baconian scholarship are at work in Spedding's reconstruction (which, it is also worth mentioning, is highly relying on Robert Leslie Elis's evaluation of both Bacon's achievements and the "scientific achievements" of early seveneteenth-century science). See Bacon, F., *Works*, vol. III, 172-73; vol. III, 510-11.
[48] Bacon, F., *Works*, vol XIV, 550-52.
[49] Bacon, F., *Works*, 552.
[50] Bacon, F., *Works*, vol. I, 378.
[51] Bacon, F., *Works*, vol I., 383-84.
[52] It is however worth mentioning that in this evaluation Spedding was relying on the verdicts formulated by Ellis. In his earlier work on Bacon, the verdict is much more nuanced. See Bacon, F., *Works*, vol I, 385; Spedding, J., *Evenings with a Reviewer; or a free and particular examination of Mr. Macaulay's article on Lord Bacon, in a series of dialogues* (London: Privately printed, 1848).
[53] On Henry Wotton's correspondence with Bacon regarding Johannes Kepler, and on Thobias Matthew's correspondence with Bacon regarding Galileo (and Galileo's answer to Bacon's theory of tides) see Jardine, L., (2007); Jardine, L. and Stewart, A., "Editing a Hero of Modern Science", in *Books and the Sciences in History*, ed. M. Frasca-Spada and N. Jardine (Cambridge: Cambridge University Press, 2000), 354-69.
[54] Bacon, F., *Works*, vol. II, 326.
[55] Rees, G., "An Unpublished Manuscript by Francis Bacon: Sylva Sylvarum Drafts and Other Working Notes", *Annals of Science* 38 (1981):377-412, 388.
[56] Rees, G., (1981).
[57] See for example Giglioni, G., "Mastering the Appetites of matter: Francis Bacon's *Sylva Sylvarum*", in *The Body as Object and Instrument of Knowledge: Embodied Empiricism in Early Modern Science*, ed. C. T. Wolfe and O. Gal (Dordrecht: Springer, 2010), 149-67; Giglioni, G., "Historia and materia: the philosophical implications of Francis Bacon's natural history", *Early Science and Medicine* 17 (2012):62-86; Corneanu, S., Giglioni, G., and Jalobeanu, D., *Francis Bacon and the Transformation of Early Modern Natural History*; Manzo, S., "Francis Bacon's natural history and civil history: a comparative survey", *Early Science and Medicine* 17 (2012):32-61; Corneanu, S., Giglioni, G., and Jalobeanu, D., "Introduction: The Place of Natural History in Francis Bacon's Philosophy", *Early Science and Medicine* 17 (2012):1-10; Anstey, P., "Francis Bacon and the classification of natural history", *Early Science and Medicine* 17 (2012):11-31. See also Jalobeanu, D., "Learning from Experiment: Classification, Concept Formation and Modeling in Francis Bacon's Experimental Philosophy", *Revue Roumaine de Philosophie* 57 (2013):forthcoming; Georgescu, L., "A New Form of Knowledge: Experientia Literata", *Societate si Politica* 5 (2011):104-21.
[58] See Webster, C., (1976); Jardine, L., (2007). More recently, Cesare Pastorino has devoted a couple of articles and a PhD dissertation to a quite thorough exploration of various ways in which Francis Bacon was fully embedded in the technological and artisan culture of late Renaissance. See Pastorino, C., "The Mine and the Furnace: Francis Bacon, Thomas Russell, and Early Stuart Mining Culture", *Early Science and Medicine* 14 (2009):630-60; Pastorino, C.,

"Weighing Experience: Francis Bacon, the Inventions of the Mechanical Arts, and the Emergence of Modern Experiment" (Indiana University, 2011). See also Pastorino, C., "Francis Bacon and the Institutions for the Promotion of Knowledge and Innovation", *Journal of Early Modern Studies* 1 (2013, forthcoming).

[59] Manzo, S., "Francis Bacon: Freedom, Authority and Science", *British Journal for the History of Philosophy* 14 (2006):245-73; Manzo, S., "Utopian Science and Empire. Notes on the Iberian Background of Francis Bacon's Project", *Studii de stiinta si cultura* 23 (2010):111-33; Serjeantson, R., (1999); Serjeantson, R., (2013 forthcoming); Martin, J., *Francis Bacon, the state, and the reform of natural philosophy* (Cambridge: Cambridge University Press, 1992).

[60] Rees, G., "Introduction", in *Instauratio Magna. Part 2. Novum organum and associated texts*, ed. G. Rees (Oxford: Clarendon Press, 2000), xxiii.

[61] Webster, C., (1976); Webster, C., ed. *Samuel Hartlib and the Advancement of Learning* (Cambridge: Cambridge University Press, 1970); Webster, C., "The Origins of the Royal Society", *British Journal for the History of Science* 6 (1976):106-28; Trevor-Roper, H. R., *Religion,the Reformation and social change and other essays* (Macmillan, 1967); Trevor-Roper, H. R., *The crisis of the seventeenth century : religion, the Reformation, and social change* (Indianapolis: Liberty Fund, 1999).

[62] For a criticism of this division see Giglioni, G., "How Bacon become Baconian", in *The Mechanization of Natural Philosophy*, ed. S. Roux and D. Garber (New York: Springer, 2012): 27-54.

[63] Hunter, M. C. W., *Science and society in restoration England* (Cambridge Cambridgeshire; New York: Cambridge University Press, 1981); Hunter, M. and Wood, P. B., "Towards Solomon's house: rival strategies for reforming the early Royal Society", *Hist Sci* 24 (1986):49-108.

[64] Malherbe, M., (1984).

[65] Giglioni, G., (2012): 52.

[66] Weeks, S., "Francis Bacon's Science of Magic" (University of Leeds, 2007).

[67] See for example Giglioni, G., (2010); Weeks, S., "Francis Bacon and the Art-Nature Distinction", *Ambix* 54 (2007):101-29.

[68] Gemelli, B., "The History of Life and Death A 'Spiritual' History from Invisible Matter to Prolongation of Life", *Early Science and Medicine* 17 (2012):134-57.

[69] For an overview see Corneanu, S., Giglioni, G., and Jalobeanu, D., "Introduction", *Perspectives on Science* 21 (2012):135-8. See also Corneanu, S., *Regimens of the Mind: Boyle, Locke, and the Early Modern «Cultura Animi» Tradition* (Chicago: University of Chicago Press, 2011). See also our previous special issue *Arts of thinking, Arts of Healing in Early Modern Europe*, special issue of *Society and Politics* (2012). Corneanu, S. and Vermeir, K., "Idols of the Imagination: Francis Bacon on the Imagination and the Medicine of the Mind", *Perspectives on Science* 20 (2012):183-206.

[70] See for example Corneanu, S., "Of Statues and Vines: Francis Bacon's New Atlantis and the Question of Persuasion", *Studii de stiinta si cultura* 23 (2010):46-58.

[71] See for example Cassan, E., "The Status of Bacon in Gassendi *Sytagma Philosophicum* History of Logic", *Societate si Politica* 6 (2012):80-89.

[72] Buccolini, C., "Mersenne traduttore di Bacon", *Nouvelles de la République des Lettres* 2 (2002):7-19; Buccolini, C., "Mersenne Translator of Bacon?", *Journal of Early Modern Studies* 2 (2013, forthcoming).

[73] Gemelli, B., "Isaac Beeckman as a Reader of Francis Bacon's Sylva Sylvarum", *Journal of Early Modern Studies* 2 (2013, forthcoming); Buccolini, C., (2013); Georgescu, L. and Giurgea, M., "Redefining the Role of Experiment in Bacon's Natural History: How Baconian was Descartes before Emerging from His Cocoon?", *Early Science and Medicine* 17 (2012):158-80.