

Merchants of Light and Mystery Men: Bacon's Last Projects in Natural History

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Abstract: This essay explores the natural history project that Bacon undertakes in the last part of his life. After setting aside the *Novum organum* and the attempt to set out a method of interpreting nature in detail, Bacon turned to the project of outlining what a natural history should look like. Part of this project involved the composition of some natural histories to serve as models of what a natural history should look like. He published two of six exemplary histories he planned, the *Historia vitae et mortis* and the *Historia ventorum*. Both of these are very carefully organized works in learned Latin. However, shortly after his death, William Rawley, his literary executor, published Bacon's *Sylva Sylvarum*, presented as "a natural history in ten centuries." The style of this work is altogether different from the Latin natural histories: it is in English, not Latin, and, as Rawley put it in his letter to the reader, "it may seeme an Indigested Heap of Particulars." In this essay, I discuss the relations between the formal Latin natural histories and the *Sylva*. Appealing to the structure of Solomon's House in the *New Atlantis*, published in the same volume as the *Sylva*, I argue that the *Sylva Sylvarum* represents the very first stages of constructing a natural history, while the Latin natural histories represent later stages in the process, where the observations, experiments, and other materials collected from various sources are arrayed in a more orderly and systematic fashion.

Keywords: Bacon, natural history, experiment, observation, natural magic, merchants

Introduction

In the last part of his life, after publishing the *Novum organum* in 1620, Bacon largely turned to the project of natural history. In those years, Bacon outlined a large project for a comprehensive natural history, organized in

different ways in different texts. Though he may have originally had the idea of saying something about each of the many, many natural histories that he had proposed in his comprehensive program, in the end he settled on just a few model histories, six to be exact, and succeeded in writing two, the *Historia vitae et mortis* (*History of Life and Death*), and the *Historia ventorum* (*History of the Winds*), and made significant progress on a third, the *Historia densi et rari* (*History of Dense and Rare*). As I will discuss in more detail, these are carefully organized and carefully composed texts, written in learned Latin, which wear their status as paradigmatic texts on their faces. However, immediately after he died, there appeared a different kind of work, the *Sylva Sylvarum*, a much more chaotic work, much more tenuously organized, in English and looking for all the world like a popular miscellany, hardly a model of natural history. But yet, it is called a natural history, and in the introduction written by William Rawley, Bacon's literary executor, presented as a kind of model of what a natural history is supposed to be. This, then, is my question: how are we to read the *Sylva*? How can we fit it into Bacon's conception of what a natural history is supposed to be doing? How can both the Latin natural histories and the English *Sylva* be models of Bacon's natural history?

I will begin with a brief discussion of the project for a natural history, as Bacon formulated it in the early 1620s, and how the Latin natural histories fit into that project. I will then turn to the *Sylva Sylvarum*, and discuss the way in which it seems to be an entirely different kind of project. I will then appeal to the project for a new science, as outlined in the *New Atlantis*, published with the *Sylva* to show how both the *Sylva Sylvarum* and the Latin natural histories can be regarded as part of the same larger enterprise.

1. *The Natural History Project*

In 1620, Bacon published his *Instauratio magna*. The volume began, of course, with an outline of the program as a whole, followed by the *Novum organum*, Bacon's treatise on the method of interpreting nature. In Bacon's six-part program, the first part is a review of current knowledge, "the sum or universal description of the knowledge or learning which the human race at present possesses."¹ The second is the method of the *Novum organum*, "the doctrine of improving and perfecting the use of reason in the investigation of things, and of the true helps of the intellect [...]"² The third part of the program is "the Phenomena of the Universe, i.e. experience of every kind, and natural history [...]"³ The fourth part was to contain examples of going from

¹ Francis Bacon, *The Oxford Francis Bacon*, Oxford: Oxford University Press, 1996-, vol. XI, 27. Hereafter this series will be abbreviated "OFB" and references given by volume number and page.

² OFB XI 29.

³ *Ibid.*.

the natural histories to natural philosophy, and the fifth part, what he called anticipations of natural philosophy, preliminary theories. The whole project was to culminate in the sixth part, the actual interpretation of nature, “that philosophy drawn from and established on the kind of legitimate, chaste and rigorous form of investigation (which I have explained and prepared previously).”⁴

The bulk of the 1620 volume was devoted to the second part of the program, the method of the *Novum organum*. Though it went on for 325 pages in the original edition, the published version was incomplete, just a portion of the treatise that Bacon had outlined for himself. Even so, in the years that followed, Bacon did not try to complete it; the fragment published was all the world was to see of the *Novum organum*. Instead, he decided to turn toward the third part of the *Instauratio*, the natural histories. In the preface to the *Historia naturalis et experimentalis*, published in 1622, Bacon wrote:

[T]here are without doubt many capacious, candid, sublime, subtle, solid, and steadfast intellects scattered the length and breadth of Europe. And what if one such intellect were to appropriate the plan and purpose of my *Organum* and put it to the test? He still does not know how to proceed, nor how to get ready to re-equip himself for philosophy. If it were something which could be achieved by poring over books of philosophy, by disputation, or by meditation, he ... might be up to the job, and do it well. But if I refer him (as I do) to natural history, and the experiments of the arts, he is at a loss: it is not what he is used to, and he has neither the time nor the money for it. ... And so it comes down to this, that my *Organum*, even if it were finished, would not carry forward the Instauration of the Sciences much without Natural History, whereas Natural History without the *Organum* would advance it not a little. And so I have thought it better and more prudent above and before all, to engage with this.⁵

Before applying the method and drawing any conclusions about natural philosophy, we must gather information about the world. This, for Bacon, is the project of natural history in its most general sense: “[...] we must prepare a sound and sufficient *Natural* and *Experimental* History, for that is the very foundation of our work. For our object is not to make up or invent what nature may do or allow, but to discover it.”⁶ And so, in the years following the publication of the *Instauratio magna*, Bacon turned his attention away from the methodological concerns of the *Novum organum* and toward the problem of writing natural histories.

Bacon, of course, didn’t think that he could complete the project of writing natural histories by himself. Instead he concerned himself with doing

⁴ OFB XI 45.

⁵ OFB XII 11-13.

⁶ *Novum organum* II.10, OFB XI 215.

what he could to show others how to undertake the project of producing the natural histories necessary for the *Instauratio* project. One thing that Bacon offers is detailed advice about how natural histories should be written. This is the main theme of the *Parasceve*, “A description of a natural and experimental history of a kind fit to serve as a plan for the basis and foundations of the True Philosophy,” which follows immediately the *Novum organum* in the 1620 volume. Bacon writes:

But I myself shall now bring men to the heart of the matter by carefully and precisely describing the way of doing the sort of history suitable for my purpose, in case they carry on regardless, let themselves be governed by the example of the natural histories now current, and wander far from my plan.⁷

Bacon wants to do a new kind of natural history, one different from the kinds of natural history found in earlier figures such as Pliny, Konrad Gesner, Georgius Agricola, and others.⁸ This isn't the place to go into the full details of how Bacon means to distinguish his kind of natural history from that of others, but a few things are worth noting. One thing Bacon emphasizes is the role that natural history must play in his larger program:

...those who take on the job of writing natural history in the future ought never to forget that they should not aim to please the reader nor even to derive immediate material advantage from their narrations, but to seek out and collect the abundance and variety of things which alone will do for constructing true axioms.⁹

In this way, Bacon's natural history is not an end in itself, but rather a step toward natural philosophy. This differentiates Bacon from one important strand of the natural history tradition which, as Brian Ogilvie put it, involved an “impulse to describe and love the particular.”¹⁰ For Bacon, the point is not

⁷ OFB XI 451.

⁸ On the relation between Bacon's natural histories and earlier natural historical projects, see especially Graham Rees's comments in the introduction to OFB XII xix-xxxiii, and Paula Findlen, “Francis Bacon and the Reform of Natural History in the Seventeenth Century,” in Donald R. Kelley, ed., *History and the Disciplines: The Reclassification of Knowledge in Early Modern Europe*, Rochester NY: University of Rochester Press, 1997, pp. 239-60. Rees and Findlen pretty much take Bacon's claims at face value. But the collection of papers edited by Sorana Corneanu, Guido Giglioni, and Dana Jalobeanu, *The Place of Natural History in Francis Bacon's Philosophy*, which came out as *Early Science and Medicine* 17 (2012), subjects Bacon's conception of natural history and its relation to the tradition to careful scrutiny.

⁹ OFB XI 457.

¹⁰ Brian Ogilvie, *The Science of Describing: Natural History in Renaissance Europe*, Chicago: University of Chicago Press, 2006, p. 269. There are other, different strands of the tradition. The Aristotelian tradition in natural history, for example, is closely linked to natural philosophy. More recently, Dana Jalobeanu has been investigating the Senecan tradition in natural

to please the reader or fetishize the particular: the reader's pleasure in the contemplation of what is found is not relevant. And so Bacon writes:

[...] no more of antiquities, citations and differing opinions of authorities, or of squabbles and controversies, and, in short, everything philological. No author should be cited save in matters of doubt, and no controversies be introduced save in matters of great moment [...]¹¹

Similarly, Bacon writes, the natural historian should avoid the amazing and curious: "we must get rid of superstitious stories [...] and the experiments of ceremonial magic."¹² And finally, he writes:

We should always remind ourselves that what is being prepared is a granary and storehouse of things, not comfortable accommodation for staying or living in, but a place we go down to when we need to fetch out something useful for the work of the *Interpreter*, which comes next.¹³

The point of natural history, Bacon reminds us, is to help us construct a natural philosophy.

In that connection, Bacon also wants to remind us that the natural histories must be comprehensive, that they must touch on all varieties of subjects. He writes:

In the history which I expect to find and am intent on we must see above all that it has a wide range and is made to the measure of the universe. For the world is not to be tailored to the slenderness of the intellect ... but the intellect should be stretched and opened up to take in the image of the world as we really find it.¹⁴

Included among the natural histories are things that aren't natural, strictly speaking, but artificial, a "History of the Arts," the "vexations of the arts."¹⁵ Nor should we limit ourselves to noble or notable features of nature: the natural histories that Bacon proposes also include things that may seem completely trivial: "This history should comprise matters so commonplace that people would imagine that, as everyone knows about them, it would be pointless to write them down."¹⁶ In short, Bacon wants a sober, comprehensive, and

history, which is more oriented toward a general and orderly description of nature. See Dana Jalobeanu, "Francis Bacon's Natural History and the Senecan Natural Histories of Early Modern Europe," *Early Science and Medicine* 17 (2012), pp. 197-229.

¹¹ OFB XI 457.

¹² OFB XI 459.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ OFB XI 463.

¹⁶ OFB XI 465.

no-nonsense collection of the widest possible breadth, all the materials that the interpreter could need on which to build a natural philosophy.

After the *Parasceve*, Bacon offers a catalogue of 130 titles of natural histories that, one supposes, would make up the complete natural history we would need for our natural philosophy.¹⁷ Much of the list is organized in a way that closely resembles the way in which a scholastic natural philosophy would be organized.¹⁸ Bacon begins with three natural histories relating to celestial matters, followed by a number of natural histories relating to meteorological matters (“fiery meteors,” wind, rainbows, clouds, rains, etc.) After four natural histories that relate to each of the Aristotelian elements, fire, air, water and earth, what he calls “histories of the greater masses,” Bacon proposes a series of histories, first of minerals, and then of living things, beginning with plants, then fish, birds, quadrupeds, and things which crawl, all of which are collectively called “histories of the species.” This is followed by the histories that relate to humans, followed by the history of the arts. Appended at the end are the histories of mathematics, both numbers and figures. Before listing these specific titles, Bacon makes a promise to his readers:

But as I am now taken up with other business, I have time to append only a *Catalogue of Particular Histories* arranged by titles. However, as soon as I can find time for the matter, I intend, by putting questions on all the individual titles, to instruct men in the case of every one of these histories what most of all should be investigated and written up to bring us nearer to the end I have in view.¹⁹

An ambitious promise.

In the preface to the *Historia naturalis et experimentalis* of 1622, Bacon came back to that list, and suggested that it should be supplemented with “titles relating to abstract natures,” “simple motions, sums of motions, measures of motions, and some other things besides.”²⁰ But in that preface, Bacon

¹⁷ For the principles of organization for natural histories Bacon proposes, see OFB XI 458-61.

¹⁸ A standard and widely-used textbook was Eustachius a Sancto Paulo’s *Summa philosophiae quadripartita*. Paris: Carolus Chastellain, 1609. The physics part is organized as follows. After a section on general physics (matter, form, privation, cause, motion, etc.), Eustachius enters into particular physics. He begins with the universe as a whole (“*Tractatus de mundo*”), followed by discussions of the heavens, the elements, mixtures, meteors (*De Terra*), including comets, rain and snow, wind and earthquakes, ending with animate bodies, including plants, animals, and humans.

¹⁹ OFB XI 473.

²⁰ OFB XII 13; cf. Bacon’s remarks in the *Instauratio magna*, OFB XI 18-19. The details are found in the *Abecearium novum*, signaled as being published at the end of the 1622 *Historia naturalis et experimentalis*, though lost and not published until 1984. For the curious history of the manuscript of the *Abecearium* and related documents, see Graham Rees’s introduction in OFB XIII xlix-lxx.

withdraws his promise to comment on each of the possible histories, something that he must have realized was an absolutely impossible task. He writes:

I have not taken the titles (since I am not up to I dealing with them all) in order but I have picked some out, which are most weighty in respect of use, handiest on account of the abundance of experiments, most difficult and noble on account of the obscurity of the thing, or, on account of the differences between the titles, the ones which present the widest range by way of example.²¹

At the head of the preface, Bacon lists the titles of the six exemplary natural histories that he had intended to write to show people how this natural history business is to be done:

Historia ventorum (History of the Winds)
Historia densi et rari (History of Dense and Rare)
Historia gravis et levis (History of Heavy and Light)
Historia sympathiae et antipathiae rerum (History of the Sympathy and Antipathy of Things)
Historia sulphuris, mercurii, et salis (History of Sulphur, Mercury, and Salt)
*Historia vitae et mortis (History of Life and Death)*²²

The histories of winds, sulphur, mercury, and salt, and life and death can all be found in the list of 130 appended to the *Parasceve*; the others (dense and rare, heavy and light, sympathy and antipathy) can be found listed among the more abstract natural histories in the *Abecedarium novum*. The *Historia ventorum* was published in the 1622 *Historia naturalis et experimentalis*. At the end of that volume, Bacon published the prefaces to the other five histories, which he described as “planned for the next five months.”²³ The *Historia vitae et mortis* came out in 1623. Though there was an extensive draft of the *Historia densi et rari*, it was not published in Bacon’s lifetime, nor were any of the other projected exemplary histories.

It would be worth taking a moment and saying something about the structure of the exemplary histories.²⁴ Let us consider the *Historia vitae et mortis*, which, for obvious reasons due to its connection with the prolongation of life,

²¹ OFB XII 15.

²² OFB XII 7.

²³ OFB XII 133.

²⁴ For general accounts of the contents of the Latin natural histories, see the introductory essays that Graham Rees wrote for the OFB. For the *Historia ventorum* see OFB XII xxxviii–xlvi; for the *Historia vitae et mortis*, see OFB XII xlvi–lviii; and for the *Historia densi et rari*, see OFB XIII xxx–xxxvi. See also Dana Jalobeanu, “Core Experiments, Natural Histories and the Art of *Experientia Literata*: The Meaning of Baconian Experimentation,” *Societate si Politica* 5 (2011), pp. 88–104. For the way in which the different Latin natural histories relate to one another, see Doina-Cristina Rusu, “Francis Bacon: Constructing Natural Histories of the Invisible,” *Early Science and Medicine* 17 (2012), pp. 112–33.

was the most popular of the two exemplary histories that Bacon published.²⁵ What I would emphasize is that the *Historia vitae et mortis* is very carefully and deliberately organized. Bacon begins with a listing of all the sub-questions that he intends to take up, in order: “Inquire into the nature of durable and less durable in inanimate bodies, and likewise in vegetables[...]” “Inquire more diligently into the desiccation, rarefaction, and consumption of inanimate and vegetable bodies[...]” “Inquire into the length and shortness of life in animals[...]” and so on.²⁶ Bacon then goes through the topics chosen, one by one. For each, he gives a listing of observations and experiments, carefully labeled as such. When he makes an observation, or gives some advice, either for things to investigate or for attaining longer life (a “*monitum*”) he notes it as such. In the middle of the history, he interrupts the discussion with what he calls “*Intentiones*”, again, explicitly labeled as such.²⁷ These are goals for medical inquiry: “the prohibition of consumption, the accomplishing of repair, and the renovation of what has grown old.”²⁸ This is followed by ten “*Operationes*,” procedures to be carried out to accomplish the *intentiones*.²⁹ He ends with 32 Rules (“*Canones*”), provisional conclusions that the reader might take to follow out of the empirical investigations undertaken earlier.³⁰ What I want to emphasize is that the *Historia vitae et mortis* is very carefully structured and organized. There is no doubt at any time where you are in the argument: the reader always knows whether Bacon is dealing with observations or experiments, theoretical observations, or provisional conclusions.³¹

²⁵ The *Historia vitae et mortis* was translated into English and published in 1638. It was added to the *Silva* in the 1651 edition, and appeared as an appendix in seven subsequent editions before 1700. The *Historia ventorum* appeared in English translation in only two editions, 1653 and 1671, both separate from any of Bacon’s other works. On the *Historia vitae et mortis*, see Benedino Gemelli, “The History of Life and Death a ‘Spiritual’ History from Invisible Matter to Prolongation of Life,” *Early Science and Medicine* 17 (2012), pp. 134-57, and Guido Giglioni, “The Hidden Life of Matter: Techniques for Prolonging Life in the Writings of Francis Bacon,” in Julie Solomon and Catherine Martin, eds., *Francis Bacon and the Refiguring of Early Modern Thought: Essays to Commemorate The Advancement of Learning*, Aldershot, England and Burlington, VT: Ashgate, 2005, pp. 129-44. Graham Rees gives a detailed account of the structure of the work in his introduction to OFB XII, pp. xlvi-lviii.

²⁶ See OFB XII 150-55.

²⁷ See OFB XII 236-37.

²⁸ OFB XII 242-43. Rees notes (OFB XII liv) that this is a standard medical term.

²⁹ See OFB XII 244-45.

³⁰ See OFB XII 346ff.

³¹ It is important to note here that the *Historia vitae et mortis* includes not only observations and experiments but also a very healthy dose of Baconian matter theory. This is a point emphasized in Giglioni, “The Hidden Life of Matter.” More generally, Ian Stewart emphasizes the importance of Bacon’s matter theory to his natural histories. See Ian Stewart, “*Res, veluti per Machinas, Conficiatur*: Natural History and the ‘Mechanical’ Reform of Natural Philosophy,” *Early Science and Medicine* 17 (2012), pp. 87-111. As Stewart argues, Baconian induction is not

I have given some care to laying out Bacon's project, and, in particular, the program for natural history that he entered into at the end of his life. Bacon's project seems as if it was carefully structured and organized at every level: there is a careful list of natural histories that must, in principle, be executed. And, if we are to follow the model natural histories that he set out in his last years, the *Historia vitae et mortis*, the *Historia ventorum*, the *Historia densi et rari*, each of these natural histories must itself be organized very carefully. It is, then, something of a surprise when we open the cover of Bacon's posthumous *Sylva Sylvarum*. Though it is identified on its title page as "a natural history in ten centuries," it is nothing at all like any of the exemplary natural histories that Bacon left for our edification, nor does it seem to fit into any of the lists of natural histories that Bacon proposed. How are we to understand it? What place does it occupy in Bacon's work?

2. *The Sylva Sylvarum*

The *Sylva Sylvarum* is organized into ten "centuries," each of which is organized into one hundred paragraphs ("experiments"). But more than that it is somewhat difficult to discern a clear principle of organization for the work. Some of the centuries are unified by theme. Centuries Two and Three, e.g., are about sound, Century Ten seems to be about the powers of the imagination. But there doesn't seem to be a clear division into subject-matters. William Rawley, Bacon's literary executor admitted in his introductory letter to the reader that "...it may seem an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have." Even so, Rawley claimed that "he that looketh attentively into them, shall find that they have a secret Order." But that order is very difficult for the average reader (or even the dedicated scholar) to discern.³²

In addition to the apparent wandering from topic to topic, Bacon seems to pass quickly from one kind of observation to another. There are some straightforward observations in the book. In the opening sections, for example, he notes that on the seashore, a pit dug in the sand will produce fresh water.³³ In other places there are some bits of high theory. In the opening of Century Nine, for example, he notes that "it is certain that *all Bodies* whatsoever,

at all the theory-free enterprise that some commentators claim it to be: his natural histories are infused with and structured by theoretical assumptions, and quite intentionally so.

³² Francis Bacon, *Sylva Sylvarum*, London: W. Lee, [1626], preface by William Rawley ("To the Reader"), unpaginated. Since there is not yet a standard modern scholarly edition of either the *Sylva* or the *New Atlantis*, and since scans of the original publication are readily available, I will refer to both of these works in their original editions. Furthermore, since all editions of the *Sylva* divide the work into 1,000 numbered "experiments," I will refer to the text of that work by way of the experiment number, when possible.

³³ *Sylva*, expt. 1ff.

thought they have no *Sense*, yet they have *Perception*.”³⁴ In some places there are more modest excursions into causal explanations, as, for example, when in expt. 68 and following Bacon speculates on the causes of cold. In some places there are also some curiosities and recipes. In the beginning of Century Six, for example, Bacon writes: “For we hate *Impostures*; And despise *Curiosities*.” But then he continues: “Yet because we must apply our Selves somewhat to Others, wee will set downe some *Curiosities* touching plants.”³⁵ What follows then are some directions for how to grow a single tree that bears many different kinds of fruits, something that he identifies as a curiosity. And finally, there are even some travelers’ reports. For example, in expt. 738, Bacon reports that “They have in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as blacke as *Soot*, and of a *Strong scent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it[...].” Even the genre of the work is sometimes called into question. Though on the title page and in much of the text, Bacon presents the *Sylva* as a natural history, there is one passage where he calls “this Writing of our *Sylva Sylvarum* [...] not *Naturall History*, but a high kinde of *Naturall Magicke*.”³⁶ Furthermore, while it is plausible to suppose that many of the observations and experiments come directly from Bacon himself, many of them don’t. While it is impossible here to trace through all of his sources, Bacon clearly borrowed experiments and observations from a number of sources. Most prominent are Aristotle’s *Problems*, Della Porta’s *Magia Naturalis*, and Sandys’s *Travels*, but there are certainly many others as well.³⁷ And, to top it off, it is written in English, not the learned Latin of the other natural histories.

What are we to make of this curious mixture of elements? It is certainly not carefully ordered and organized in the way in which the Latin natural histories are, the ones that Bacon fashioned as models of what a natural history is supposed to look like. Furthermore, unlike any of the exemplary Latin natural histories, the *Sylva Sylvarum* doesn’t have a single recognizable theme: it would seem to fit nowhere within the careful catalogue that Bacon wrote of natural histories that he was recommending be written. But yet...it is still *called* a natural history. Rawley goes so far as to write in his preface that “this *Natural History* was a Debt of his, being Designed and set downe for a third part of the *Instauration*.” What, then, are we to make of this curious work?

One might conjecture that the *Sylva* is not really by Bacon, in a sense, but it the work of his editor, Rawley. On this view, one might suppose that on Bacon’s death, Rawley took material that Bacon had been collecting for his

³⁴ *Sylva*, p. 211.

³⁵ *Sylva*, p. 131.

³⁶ *Sylva*, expt. 93.

³⁷ On the question of sources, see Graham Rees, “An Unpublished Manuscript by Francis Bacon: *Sylva Sylvarum* Drafts and Other Working Notes,” *Annals of Science* 38 (1981), pp. 377-412, esp. pp. 389-90.

proper natural histories, that is, the Latin natural histories, and just tossed it all together in a somewhat disorganized heap so as to have a last work to publish after the great man's death. There is some small support for this view, which I once found attractive. In 1981, Graham Rees published a short Bacon manuscript which contained a somewhat disorganized variety of notes, some of which found their way into the *Sylva Sylvarum*, as well as the *Historia vitae et mortis*, the *Inquisitio de magnete*, and the *Topica inquisitionis de luce et lumine*.³⁸ One might suppose that there were other such manuscripts extant at the time of Bacon's death from which Rawley could draw. From a different angle, there is a French work entitled *Histoire Naturelle de M^{re} Francois Bacon*, which contains some amount of the material in the *Sylva*, but organized in a much more coherent way, into six books. In his "advertissement," the mysterious Pierre Amboise, the compiler and translator claims to be representing Bacon's own ordering of the material. He writes:

I would like to warn the reader that in this translation, I haven't carefully followed the order observed in the original English [of the *Sylva Sylvarum*], since I found too much confusion in the setting out of the material, which seems to have been distributed into many different places, more by caprice than by reason. Aided for the most part by the author's manuscripts, I judged it necessary to add or reduce many things which were omitted or added by Mr. Bacon's chaplain [i.e. Rawley], who after the death of his master, confusedly published all of the papers that he found in his study.³⁹

But, on the other side, there is considerable evidence that the *Sylva* was very much Bacon's work. There are at least three places in the work where the author refers to "this our *Sylva Sylvarum*."⁴⁰ While it is possible that Rawley inserted these, they do suggest that the *Sylva Sylvarum* was a work that Bacon himself had planned. Furthermore, as David Colclough has shown, the *Sylva Sylvarum* was entered in the Stationers' Register on 9 April 1626, ten days before Bacon died.⁴¹ This strongly suggests that the work was at very least largely completed before Bacon died, and thus that the form in which it was published was the form in which he had intended to publish it.

Alternatively, one might try to relate the *Sylva Sylvarum* to what Bacon wrote about how to do natural history, and thereby try to find the hidden structure that Rawley seems to claim was there. On this view, one might argue

³⁸ See Graham Rees, "An Unpublished Manuscript..." p. 379.

³⁹ Francis Bacon, *Histoire Naturelle de M^{re} Francois Bacon*, ed. and trans. Pierre Amboise, Paris: Chez Antoine de Sommaville et Andre Soubron, 1631, advertissement (unpaginated).

⁴⁰ See *Sylva*, expts. 93, 525, and pp. 221-22.

⁴¹ David Colclough, "'The Materialls for the Building': Reuniting Francis Bacon's *Sylva Sylvarum* and *New Atlantis*," *Intellectual History Review* 20 (2010), pp. 181-200, esp. p. 181.

that despite initial appearances, the *Sylva Sylvarum* really does have something of the same structure as the Latin natural histories. Dana Jalobeanu and Laura Georgescu, for example, have argued that the key to understanding the *Sylva* is the concept of *experientia literata*.⁴² Bacon argues that experiments must be done in a careful and systematic way, “according to a certain law, step by step and steadily.” Until our experience becomes “literate” in this way, Bacon argues, we cannot hope for any advances.⁴³ Jalobeanu and Georgescu try to show how the *Sylva Sylvarum* exemplifies this procedure, and how despite appearances, Bacon’s experiments are connected in orderly ways with one another in a number of important senses. I agree that the concept of *experientia literata* is important to Bacon, and that it can be found exemplified in the *Sylva*, but even so, the mystery remains: why would Bacon have hidden these structures in the *Sylva*? If it was intended to be an example of how to do a natural history, why wouldn’t he have shown the structure, in the way in which he did in the Latin natural histories? If he was really doing the same kind of thing in the *Sylva* that he was doing in the Latin natural histories, why would he have hidden it?

Alternatively still, one might argue that despite what is printed on the title page, and despite Rawley’s claims in his Letter to the Reader, the *Sylva Sylvarum* isn’t really intended to be a natural history, strictly speaking. Drawing on passages such as expt. 93, quoted earlier, Sophie Weeks and Doina-Cristina Rusu have suggested that the *Sylva* is intended to be a treatise on natural magic.⁴⁴ Magic, for Bacon, is the operative science that is connected with metaphysics: it is the control of nature through understanding the formal and final causes of things.⁴⁵ There is no question that there are elements of the *Sylva* that Bacon thought of as a “higher form” of natural magic. Rusu, for example, shows a number of ways in which in the *Sylva*, Bacon draws on the *Magia naturalis* of Della Porta, and transforms it into a kind of Baconian operative science.⁴⁶ In this way, one can say, Bacon thought of what he was doing as a form of natural magic higher than that of which Della Porta was capable. However, there is a great deal in the *Sylva Sylvarum* that simply doesn’t fit the

⁴² See Dana Jalobeanu and Laura Georgescu, “Experientia literata in *Sylva Sylvarum*,” forthcoming, given as a talk at the May 2012 Princeton Seminar on the *Sylva Sylvarum*. See also Dana Jalobeanu, “Learning from Experiment: Classification, Concept Formation and Modeling in Francis Bacon’s Experimental Philosophy,” *Revue Roumaine de Philosophie* 57, no. 1 (2013), pp. 75-93 and Dana Jalobeanu, “Francis Bacon’s Experimental Series and the Art of Experimenting,” forthcoming.

⁴³ *Novum organum* I.100, I.101.

⁴⁴ See Sophie Weeks, *Francis Bacon’s Science of Magic*, unpublished Ph.D. dissertation, University of Leeds, 2007 and Doina-Cristina Rusu, *From Natural History to Natural Magic: Francis Bacon’s Sylva Sylvarum*, unpublished Ph.D. dissertation, Radboud University Nijmegen and University of Bucharest, 2013.

⁴⁵ See *De augmentis scientiarum* III.5.

⁴⁶ See Rusu, *From Natural History to Natural Magic*, chaps. 4 and 5.

category of natural magic, observations, experiments, travelers' tales and the like. I find it very difficult to believe that Bacon meant the entire work, or even the greater part of the work to be understood as natural magic. Similarly, Guido Giglioni has suggested that the book is intended as an exposition of Bacon's matter theory.⁴⁷ Giglioni sees the *Sylva* as developing an experimental presentation of his views of matter grounded in the notion of appetite. Again, while the *Sylva Sylvarum* includes a great deal of Bacon's matter theory, it also includes a great deal of other material that doesn't fit this hypothesis very well.

There is another hypothesis which takes the *Sylva Sylvarum* altogether outside of the rigorous scientific project of the *Instauratio magna*. On this reading, which I once found attractive, Bacon is taken to have conceived of the *Sylva* as a kind of sugar-coated presentation of his program: elements to appeal to the fantastic, recipes to follow, things to carry out for yourself. In that way it draws the reader in. One might think of it as a Baconian natural history, rearranged to look like a popular miscellany, and larded with elements of the fantastic and lurid to draw the reader in, like a comic-book version of a classic novel. In this way, one might think of it as a version of a Baconian natural history for the masses. There were many comparable books in Bacon's day: Hugh Plat's *Jewell House of Art and Nature* (1594), Sir Kenelm Digby's *Choice and experimented receipts...* (1668), Scipion Dupleix's, *The resolver, or Curiosities of nature* (1635), Jacque Gaffarel's *Unheard of curiosities concerning the talismanical sculpture...* (1650), or Marin Mersenne's *Questions inouyes* (1633). On this view, then, the *Sylva Sylvarum* is not properly speaking part of the project of the *Instauratio magna*, unlike the *Historia vitae et mortis* or the *Historia ventorum*. Instead, it stands outside of the main project, a bright and shiny bauble intended to attract the crowds.

I still think that there is something to this reading of the *Sylva*. I'm struck, for example, by the fact that Bacon mentions that he includes curiosities, despite the fact that he claims to hate them, as I mentioned earlier. But even so, I don't think that this reading is exactly right. I now think that Rawley was reporting Bacon's view honestly when he says that he had intended the *Sylva* for "a third part of the *Instauratio*."⁴⁸ But to see how it might fit in, we need to take a short detour to a closely related work, the *New Atlantis*, Bacon's utopian fantasy, published in 1626 together with the *Sylva Sylvarum*, and to the organization of Salomon's House, Bacon's proposed scientific society.

At the very end of the *New Atlantis*, Bacon lists various groups of investigators who comprise the members of Salomon's House. He begins with those who start the process off by collecting the very first material:

⁴⁷ Guido Giglioni, "Mastering the Appetites of Matter: Francis Bacon's *Sylva Sylvarum*," in Charles Wolfe and Ofer Gal, eds., *The Body as Object and Instrument of Knowledge: Embodied Empiricism in Early Modern Science*, Dordrecht: Springer, 2010, pp. 149-68.

⁴⁸ *Sylva*, "To the Reader".

For the seuerall *Employments* and *Offices* of our *Fellowes*; Wee haue Twelue that Sayle into *Forraine Countries*, vnder the *Names* of other *Nations*, (for our owne wee conceale;) Who bring vs the *Bookes*, and *Abstracts*, and *Patternes* of *Experiments* of all other *Parts*. These wee call *Merchants of Light*.

Wee haue Three that *Collect* the *Experiments* which are in all *Bookes*. These wee call *Depredatours*.

Wee haue Three that *Collect* the *Experiments* of all *Mechanicall Arts*; And also of *Liberall Sciences*; And also of *Practises* which are not *Brought into Arts*. These we call *Mystery-Men*.

Wee haue Three that try *New Experiments*, such as themselues thinke good. These wee call *Pioners* or *Miners*.

Wee haue Three that *Drawe* the *Experiments* of the *Former Foure* into *Titles*, and *Tables*, to giue the better light, for the drawing of *Observations* and *Axiomes* out of them. These wee call *Compilers*.⁴⁹

The activity described in the beginning of the listing of members is, I claim, what the *Sylva* is supposed to represent.⁵⁰ It describes very closely exactly the kind of things that we find collected in the *Sylva*: many are experiments and observations taken from books, many are tricks from the mechanical arts, or from agriculture, the cultivation of trees and other plants, and some are experiments that Bacon claims to have performed himself. These constitute the raw materials from which the “*Titles* and *Tables*” are constructed by the group that Bacon calls the “compilers” in the *New Atlantis*. These “*Titles* and *Tables*,” I would think, correspond to the stage of investigation we find in the Latin natural histories, where things are set out in a systematic order, in preparation for beginning to draw axioms out of them. The *Sylva* is, as it were, the storehouse from which the Latin natural histories are to be drawn.

In this way the *Sylva* might nicely fit into the project of natural histories as outlined in part III of the *Instauratio magna*: the *Sylva* can be thought of as representing the stage preliminary to the formal setting out of things into tables and ordered lists. It is also a stage that doesn't require as much talent and discipline as the higher rungs of the project does. For this reason Rawley remarks on the order of the *Sylva*. According to Rawley, Bacon was reluctant to

... put these Particulars into any exact *Method*, (though he that looketh attentively into them, shall find that they have a secret Order) was, because hee conceived that other men would not thinke, that they could doe the like; And

⁴⁹ *New Atlantis*, 43-44. Even though the *New Atlantis* was published as an appendix to the *Sylva Sylvarum*, it was paginated separately.

⁵⁰ David Colclough, “The Materialls for the Building...,” pp. 191, 198-99 hints at this link between the *Sylva* and the *New Atlantis*. But the main focus of his extremely impressive and detailed study is the more general relation between the *Sylva* and the *New Atlantis*, and less the relation between the *Sylva* and the Latin natural histories.

so goe on with a further Collection: which if the *Method* had been Exact, many would have despaired to attaine by Imitation.⁵¹

The Latin natural histories are pretty intimidating to a neophyte: they are comprehensive and extensive and carefully organized. They are also not where a natural historian would begin investigation: they represent a later stage of the project, where, drawing on less rigorously organized collections of observations, experiments, and other diverse materials, such as we find in the *Sylva*, the “compiler” puts together his lists. Unlike the Latin natural histories, which are models of what a semi-finished project would look like, the *Sylva* is a model for the neophyte natural historian about how things look when you first start out.

But even this beginning stage is not completely free-form. For example, I agree with commentators who have noted that the *Sylva* is, in a way, guided by *experientia literata*: Bacon knows where he is going with the contents of the *Sylva*, and the material is often (though not always) guided by the goal of collecting material suitable for arranging into the appropriate lists and tables. There are moments where you can almost see the grid-lines of the Baconian tables behind the organization of experiments in the *Sylva*.⁵² And, at the same time, it is obvious why such a collection of preliminary experiments could appeal to the less-learned reader, and stimulate them to go off and do their own investigations.

But, at the same time, understood in this way, it is clear how the apparent jumble of observations, experiments, and comments that make up the *Sylva Sylvarum* could fit squarely into the project of the *Instauratio magna*, the first steps toward the Latin natural histories that constitute the true models for the natural and experimental histories that are at the core of Bacon’s project.⁵³

⁵¹ *Sylva*, “To the Reader”.

⁵² See, e.g., *Sylva*, expts. 115ff, where Bacon gives instances of motion that are not accompanied by sound. This suggests very strongly the table of absence found in *Novum organum* II.12.

⁵³ I would like to thank the members of the seminars on the *Sylva Sylvarum* at Princeton University in April 2009 and again in May 2012. I would also like to thank the participants in the conference in Bucharest in May 2013, where this paper was first presented. Kathryn Murphy read an earlier version of the paper and sent valuable comments, for which I am very grateful. I also received a number of very helpful comments from two anonymous referees for this journal. I would like to thank them for the care with which they read my essay; they saved me from a number of embarrassing gaffs. But special thanks go to Dana Jalobeanu, who first stimulated my interest in Bacon’s thought, and continues to inspire me to work on these topics, along with her very impressive group of students, the Bucharest Baconian Mafia, including especially Laura Georgescu and Doina-Cristina Rusu. I am especially indebted to her for her generous comments on an earlier and very imperfect draft of this paper.

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