Francis Bacon and the Moral Material of Individual Knowledge in Seventeenth-Century England

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PhD

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History

October 2022

Abstract

This thesis explores the distinction between the individual and collective domains of goodness and moral virtue as delineated by Francis Bacon (1561-1626). Bacon contends that the human qualities of individual *reason, goodness* and *moral virtue* must guide the mind and body in the pursuit of knowledge, and, in particular, in the practice of natural inquiry. Bacon prescribes that the self-construction and cultivation of the inquirer's individual goodness and the subsequent husbandry of the moral virtues must precede the endeavour to engage in the interpretation of nature. This study thus diverges from historiography that prioritises the collaborative element of Baconian inquiry and the epistemological authority of communitarian consensus in the acquisition of natural knowledge. My analysis finds that Bacon's precepts for the operative pursuit of natural inquiry emphasise the self-disciplined sensory-intellectual engagement with nature and transmission of knowledge through literary record. The authority of consensus in assessing the epistemological worth of new knowledge is unreliable and susceptible to persuasion. This work further examines the activities of Samuel Hartlib (1600-1662), John Dury (1596-1680), and Robert Boyle (1627-1691) in the respective contexts of their intersecting careers as each adopted Bacon's precepts to the ends of their own individual endeavours. It argues that Boyle is particularly motivated by Bacon's philosophy to undertake a life of experimental practice founded on the material of individual goodness and moral virtue. As such, he is an exemplar of the morally sound, independent inquirer envisioned by Bacon.

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Abbreviations

AL Francis Bacon, *The Advancement of Learning*, ed. Michael Kiernan, Vol. 4 of *The Oxford Francis Bacon* (Oxford: Clarendon Press, 2000).

Bcorr Robert Boyle, *The Correspondence of Robert Boyle, 1636-61*, Vol. 1, eds. Michael Hunter, Antonio Clericuzio, and Lawrence M. Principe (London: Pickering & Chatto, 2001).

DPAO Francis Bacon, *ON PRINCIPLES AND ORIGINS* According to the Fables *OF CUPID AND CŒLUM* Or *The Philosophy of PARMENIDES AND TELESIO and especially that of Democritus as it is treated in the fable of CUPID,* in *Philosophical Studies c.1611-c.1619,* ed. Graham Rees, trans. Graham Rees and Michael Edwards, Vol. 6 of *The Oxford Francis Bacon* (Oxford: Clarendon Press, 1996).

DSV Francis Bacon, "De sapientia veterum (Of the Wisdom of the Ancients)," in *Literary and Professional Works 1*, Vol. 6 of *The Works of Francis* Bacon, eds. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath (Cambridge: Cambridge University Press, 2011).

Ess Francis Bacon, *The Essayes or Counsels, Civill and Morall*, ed. Michael Kiernan, Vol. 15 of *The Oxford Francis Bacon* (Oxford: Clarendon Press, 1985, 2000).

HDC G. H. Turnbull, *Hartlib, Dury and Comenius: Gleanings from Hartlib's Papers* (Liverpool: University of Liverpool Press, 1947).

HP Samuel Hartlib, Hartlib Papers, Western Bank Library Special Collections, University of Sheffield, dhi.ac.uk/hartlib/context.

NO Francis Bacon, *Novum organum*, in *The* Instauratio magna *Part II:* Novum organum *and Associated Texts*, eds. and trans. Graham Rees with Maria Wakely, Vol. 11 of *The Oxford Francis Bacon* (Oxford: Oxford University Press, 2004).

OAPL Francis Bacon, *Of the Advancement and Proficience of Learning; or, The Partitions of Sciences […]*, trans. Gilbert Wats (Oxford, 1640). https://www.biodiversitylibrary.org/bibliography/39027.

OFB Francis Bacon, *The Oxford Francis Bacon*, eds. Graham Rees and Lisa Jardine, 15 vols. (Oxford: Clarendon Press, 1996–).

PAH	Francis Bacon, "PARASCEVE AD HISTORIAM NATVRALEM, ET EXPERIMENTALEM (A PREPARATIVE TO A NATURAL AND EXPERIMENTAL HISTORY)", in *The* Instauratio magna *Part II:* Novum organum *and Associated Texts*, eds. and trans. Graham Rees with Maria Wakely, Vol. 11 of *The Oxford Francis Bacon* (Oxford: Oxford University Press, 2004).
PA	Francis Bacon, "Preface" to *PRODROMI Sive ANTICIPATIONES PHILOSOPHIÆ SECVNDÆ*, in *The* Instauratio magna*: Last Writings*, ed. and trans. Graham Rees, Vol. 13 of *The Oxford Francis Bacon* (Oxford: Clarendon Press, 2000).
ODNB	Oxford Dictionary of National Biography [online]
OED	Oxford English Dictionary [online]
Leviathan	Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 2018).
SHoT	Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago: University of Chicago Press, 1994).
WGI	Charles Webster, *The Great Instauration: Science, Medicine and Reform, 1626-1660* (London: Duckworth,1975).

Note on the Text

In this study, I have opted to use gendered, masculine pronouns ("he," "his," etc.) to refer to abstract subjects rather than gender-neutral pronouns. I have done so to the end of maintaining consistency with the early modern language of Bacon and other figures discussed in this study. All year dates are given in the New Style (pre-1752) format. Thus, the years accompanying the months January through March will be given as the new year rather than the continuing year of the Old Style format. For example, January, February, and March (1-24) are given according to the modern standard, e.g., January 1627, rather than January 1626/7.

All italics in direct quotes from primary and secondary sources are given as they appear in the original text except where expressly noted. Unless otherwise noted, all translations are my own.

Dedication

To the memory of my father,
Herbert Fredrick Taylor

Acknowledgements

I am deeply grateful to my supervisor, Dr Sophie Weeks, whose incisive, cogent, and unstinting criticism and commentary have only been matched by her patience and kind support. Her advice and guidance have been absolutely crucial to the progress of my research. My sincere thanks to Dr Mark Jenner, my Thesis Advisory Panel supervisor, whose critical and thoughtful advice has been extremely valuable and, again, given only in a spirit of patience and support. Additionally, I am indebted to my examiners, Professor Simon Ditchfield and Dr Stephen Clucas, whose guidance has been invaluable. My further thanks to Dr Natasha Glaisyer, whose quick responses to my urgent inquiries and ready guidance have provided calm in the storm. Many thanks also to the History Department administrative staff for their help and patience throughout. Thanks also to the staff of Morrell Library, who have been truly helpful and gracious, and to the staff at York Minster Library for their kind assistance. Finally, I am ineffably grateful to my wife, Kim, without whose love, support, partnership, and sacrifice this endeavour would not have been possible.

Declaration

I declare that this thesis is a presentation of my original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References.

Chapter 1: Introduction

> For if two things be suppos'd, *that the ends of Actions be Honest and Good; and that the Resolution of the mind, for the pursuing and obtaining them, be fixt, constant, and true unto such ends*; it will follow that the mind shall forthwith transforme and mould it selfe into all virtues at once. And this is indeed an operation, which resembleth the *work of nature.*[1]

1.1 The Course of Reason

This thesis examines why Francis Bacon (1561-1626) considers individual goodness and moral virtue to be crucial to natural inquiry and the interpretation of nature. I assert that Bacon understands the positive, active, and appetitive material and power of human goodness – and so its agents in the mind, the moral virtues – to be products of deliberate human invocation and husbandry rather than of divine and inherent instillation. From this ontological analysis, I will explore the practical nature of his epistemological and methodological scheme for the exercise of natural inquiry.

Bacon's epistemology for the advancement of learning begins with *goodness*. In his view, goodness extends from the reason of the human will and corresponds to the original appetitive material power inherent in the workings of nature. I assert that Bacon has formed his idea of reason and goodness from the Stoic substance of reason and goodness, that is, from the pre-Christian Heraclitean (Heraclitus, c.540 BCE-c.480 BCE) "logos" (λόγος).[2] Bacon

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[1] Francis Bacon, *OAPL*: *Of the Advancement and Proficience of Learning; or, The Partitions of Sciences […]*, trans. Gilbert Wats (Oxford, 1640), 360. https://www.biodiversitylibrary.org/bibliography/39027. This study refers to the English version of *De dignitate et augmentis scientiarum* (1623) entitled *Of the Advancement and Proficience of Learning or the Partitions of Sciences IX Bookes* which was translated by Gilbert Wats and published in 1640. Going forward, I refer to this work in my text as *De augmentis*, the accepted, shortened form of Bacon's original Latin title, though I cite the work as *OAPL*. The reason I have used this particular edition of that work rather than the standard 1858 English version published in *The Works of Francis Bacon, Vols. 4* (Books 2-6) and 5 (Books 7-8) collected, translated, edited by James Spedding, Robert Leslie Ellis, and Douglas Denon Heath is that the 1640 Gilbert Wats translation was particularly prized by Samuel Hartlib, John Dury, and Jan Amos Comenius. As I examine the influence of Bacon's philosophy on these individuals in the decade of the 1640s, I thus seek a view to their enthusiasm by consulting the precise language of Wats' translation which they so revered.

[2] Edwin L. Minar has left us not just an edificatory survey of the Heraclitean "logos," but what in addition serves as an equally helpful preparatory for the discussion of Francis Bacon contained in this thesis. Minar explains: "Heraclitus speaks of a power which pilots the world, and the λόγος has been thought to be simply equivalent to this. Sometimes, Heraclitus seems to identify it loosely with the gods and to attribute to it some of the elements of personality. It is dangerous however to over emphasize this fact, because Heraclitus was much more interested in the philosophy of natural process than in theology as such. His expressions about the gods and the divine are in part rationalistic and opposed to the spirit of traditional religious conceptions, in part poetic and general, clothing in theological language ideas which are in essence entirely secular." Edwin L. Minar, Jr.,"The Logos of Heraclitus," *Classical Philology* 34, no. 4 (October 1939): 326. https://www.jstor.org/stable/264096.
As I will discuss below, Bacon seems to have all but consciously and deliberately appropriated the lingual and semantic method wherein, like that of Heraclitus, secular ideas are cloaked in theological language. In *Novum organum*, Aphorism 42, Bacon censures what he identifies the "Idols of the Cave," which denote the insular and

expands the Stoic application of the term: in his philosophy and epistemology, goodness drawn from reason is as vital an appetitive material in the human being as it is in nature. However, where the goodness drawn from reason – or *right reason*, as the Stoics and Bacon have named it – is inherent in nature, Bacon contends that goodness in men must be deliberately cultivated by each human individual from the reason, which is inherent, of their will. However, I assert that Bacon does not consider *goodness* to be inherent, whether by divine or any other instillation, in the reason of the human will. The reason of the human will is, so to speak, unclaimed.

The individual human cultivation of goodness from the reason of the will necessarily precedes the further cultivation of the moral virtues. It is the activation of this scheme wherein reason is deliberately applied to goodness and goodness, in turn, to the cultivation of the moral virtues, that enables the natural inquirer to transcend the obstructive weaknesses – or, as Bacon names them, *Idols* – that compromise the proper application of sense and intellect in the endeavour to understand nature.[3] Bacon seeks to reform the individual human instrument so that it works by its own reason and goodness toward the acquisition of useful knowledge and so to the perpetual benefit of humanity. It is from within the context of this scheme that this study further analyses the degree to which Bacon's prescriptions include or do not include the sanctions of collective consent and communitarian belief as criteria in the judgment and authority of experimental validity. I also examine the degree to which Bacon considers this scheme to be, or not to be, a work of Christian piety.

The chronological span of study begins with Bacon's late-sixteenth and early-seventeenth-century writings and continues through the life of Robert Boyle (1627-1691). I give subsidiary emphasis to the years between 1620, the publication year of Bacon's *Novum organum*, and 1650, the year confirmed by historian Michael Hunter as the first in Robert Boyle's assumption of the identity of experimental practitioner.[4] It is within this internal span that the thesis explores Bacon's influence on the work of Samuel Hartlib (1600-1662) and John Dury (1596-1680).

While I cite a breadth of Bacon's writings throughout his literary career beginning in the 1590s, nonetheless I emphasise *Novum organum* (1620) and *De dignitate et augmentis*

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misleading "den" of facile assumptions about the world held by the individual "which scatter[ ] and discolour[ ] the light of nature." He recalls and seconds analogous criticism given by Heraclitus, who, according to Bacon, chastised the "men [who] looked for the sciences in their own little worlds and not in the big wide world that is common to all." (Bacon, *NO*, 81).

[3] For description of the four classes of Idols of the Mind, see Bacon, *NO*, 88-99 (Latin and English), Aphorisms 52-62.

[4] Michael Hunter and Edward B. Davis, "General Introduction," in *The Works of Robert Boyle, Volume 1*, edited by Michael Hunter and Edward B. Davis (London: Pickering and Chatto Limited, 1999), xxiii.

scientiarum (1623) for their particular influence on Samuel Hartlib and John Dury beginning in the late 1620s. It is they who will notably "carry" Bacon's philosophy through these particular decades. Hartlib in turn, will emphasise Bacon's work in his association with Robert Boyle, which began in earnest in 1646. Inspired by Bacon, Boyle would henceforth commit himself fully to experimental practice and philosophy by 1650. As such, the thesis further illuminates the direct cause-and-effect link between Bacon's philosophy and Boyle's practice, establishing Boyle as a Baconian practitioner.

It is of particular interest to my argument that the initial progress of Bacon's Great Instauration beginning in the late 1620s achieves momentum with non-scientific reformers who are invested in decidedly non-scientific projects, viz., Hartlib and Dury. Such appeal speaks a great deal to the deeper thrust of Bacon's philosophical endeavour. Further, that such an individual as Hartlib, who was not engaged in natural inquiry, would in turn pass Bacon's precepts on to Robert Boyle, who would be motivated by them to himself initiate a career of natural and experimental inquiry, speaks even more to that thrust.

Thus, if Bacon occupies a place as the "father" of the modern scientific method in prevailing historiography, I find that title insufficient. Bacon intends his project to be a redrawing of the human animal from a foundation of goodness and moral virtue. I do not find him to be the empiricist "slave to method" that many post-Mertonian twentieth-century scholars might claim him to be.[5] However, this misapprehension does not diminish the crucial influence of Bacon's wider programme of the Great Instauration on the methodological and epistemological development of seventeenth-century natural inquiry and, by extension, of modern science. Bacon's philosophy calls for a comprehensive reform of inquiry which ties the biological, spiritual, and existential condition of mankind – of each individual human being – to Nature herself. Not least, Bacon's lifelong philosophico-literary labours are marked by an unwavering consistency of perspective, assertion, and expression. Such consistency and

[5] Aside from Merton's views regarding the relationship of English Protestantism and natural inquiry, Edgar Zilsel, in 1942, four years after Merton published his famous volume, entered his own argument for a decidedly more secular scientific sociology, the roots of which trace back to a culture of increasing specialisation in trades and crafts beginning in medieval times. See Robert K Merton's *Science, Technology & Society in Seventeenth-Century England* (New York: Howard Fertig, 1970). The hinge of this activity that allowed for the advance of seventeenth-century appeared, according to Zilsel, "when . . . the experimental method . . . overcame the social prejudice against manual labor and was adopted by rationally trained scholars." See Edgar Zilsel, "The Sociological Roots of Science," in *American Journal of Sociology* 47, no. 4 (January 1942): 544 ff. https://www.jstor.org/stable/2769053. Peter Dear points out that Bacon's "convolutions in trying to invest practical, operational knowledge with the status and legitimacy of natural philosophy . . . indicate how far [Bacon's 'respectable intellectual pedigree for operative knowledge' (Dear)] was from natural philosophy's usual profile." Peter Dear, "What is the History of Science the History *Of*? Early Modern Roots of the Ideology of Modern Science," *Isis* 6, no. 3 (September 2005): 396.

constancy of vision enables our analysis to invoke a range of his materials spanning from 1597 to his death in 1626.

1.2 The Good and Moral Project of Bacon's Great Instauration

Beginning in the late 1620s, Samuel Hartlib and John Dury were among the first notable individuals to adopt Bacon's philosophy as a practical working model for their own purposes. Significantly, neither were natural philosophers nor experimental practitioners. Instead, these two figures distilled from Bacon's precepts an apt guide for their endeavours which were devoted to educational reform, ecumenical unity, and ecclesiastical – that is to say, Protestant – irenicism. Thus, we find that the initial applications of Bacon's philosophy are socio-political and even spiritual in nature rather than scientific. This is a point which deserves emphasis. These first of Bacon's epistemological disciples respond not to a Baconian empirical methodology devoted to the experimental inquiry into nature, but to the aspects of his works which pertain to individual and civil moral behaviour. Further, Bacon's moral philosophy will be "returned," so to speak, through Hartlib to the world of the experimental practice represented by Robert Boyle. At the time Boyle begins his correspondence with Hartlib in the mid-1640s, the former has not yet assumed his identity as an experimental practitioner.[6] However, he will do so subsequent and due to that introduction. Evidence shows that Hartlib emphasises Bacon's work from his (Hartlib's) first communications with Boyle.

Bacon considers Man's experimental and interpretive relationship with nature to comprise a fundamentally good and moral exercise. The self-disciplined cultivation of goodness from the reason of his will, which thus enables his moral dedication to the production of useful works *and* useful philosophy, are, in Bacon's view, essential to the endeavour of the natural inquirer. The thesis investigates *why* Bacon considers this to be so. Robert Boyle, who was a crucial progenitor in the development of the modern scientific method, himself first receives Bacon's philosophy as a fundamentally moral project.

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[6] Robert Boyle returned from his grand tour of Europe in 1644 at the age of seventeen. Upon landing, "'he posted away from Dover to London, where he found by Inquiry, for he had no full address to her, where he found where his sister the Lady Catherine Jones [neé Katherine Boyle, who had become Lady Ranelagh upon her marriage to Arthur Jones, Lord Ranelagh in 1630] who was fled thither out of Ireland, was lodg'd.'" When Boyle and Hartlib began correspondence in 1646, Boyle would have been twenty years old. Quoted passage taken from Robert Boyle, "An Account of Philaretus," in R.E.W. Maddison, *The Life of the Honourable Robert Boyle FRS,* (London: Taylor & Francis Ltd, 1969), 53. The original manuscript of Philaretus, written in Boyle's own hand, comes to an abrupt end prior to this episode in Boyle's life. Michael Hunter includes this same passage from the same source in Robert Boyle, *Robert Boyle by Himself and His Friends with a Fragment of William Wotton's Lost Life of Boyle,* edited by Michael Hunter, (London: William Pickering, 1994), 24-25. See also: Robert Boyle and Thomas Birch (intervening commentary) in Robert Boyle, *Robert Boyle: The Works I,* edited by Thomas Birch, (Hildesheim: Georg Olms Verlagsbuchhandlung, 1965 [originally published 1772]), xxvii; Michelle DiMeo, *Lady Ranelagh: The Incomparable Life of Robert Boyle's Sister,* (Chicago: The University of Chicago Press, 2021) 48-49; Carol Pal, *Republic of Women: Rethinking the Republic of Letters in the Seventeenth Century,* (Cambridge: Cambridge University Press, 2012), 146-147.

My thesis contends that if Boyle, whose Christian piety is well-known, is a singularly key figure of the early modern era in the evolution of modern scientific practice, it is the natural philosophy developed by Francis Bacon earlier in the seventeenth century that presents experimental and interpretive inquiry as a basic function of virtue. Bacon links scientific inquiry to the voluntary labour of goodness in Man. This unique aspect of natural inquiry is what attracts Robert Boyle to experimental practice. As prescribed by Bacon, Boyle's empirical and mathematical approaches to experiment operate under his own self-disciplined aegis of moral virtue. We will see that Bacon's reasoning for this morally guided epistemological scheme is itself tied to his parallel standards of utility and human beneficence as the measures of successful inquiry.

1.3 The New Atlantis: Bacon's Reform of the Individual Practitioner

I devote particular analysis to the utilitarian *material* of which Francis Bacon's goodness and the virtues are comprised. Bacon intends that the individual natural inquirer develop his own power of moral virtue in tandem with the intellect as a means to most effectively observe, interpret, and manipulate nature. It is Bacon's moral precepts, rather than his empirical methodology, that supply the original substance of natural-philosophical development in seventeenth-century England. In this light, we may view the Baconian, and thus Boylean, approach to natural and experimental philosophy as fundamentally sensory, intellectual, and moral projects.

Useful knowledge in the Baconian sense arrives through the understanding an inquirer achieves from the direct observation and interpretation of nature. He subsequently realises his knowledge amongst the arts that human beings use to survive and improve their condition on Earth, in particular, the postlapsarian world where Man finds himself an animal beholden to nature, the intermediary between himself and God. The interpretation of nature in Bacon's scheme of natural philosophy is thus a sacrosanct human pursuit. Bacon insists that inquiry into nature's secrets be carried out by the individual experimenter according to a discipline of equilibrium between sensory experience and interpretive intellect. The engagement of one without the other, or an emphasis on one at the expense of the other, causes a fundamental flaw in the integrity of experiments.[7] I explore how Bacon prescribes that equilibrium be established and maintained.

[7] We note the semantic field which contains the term "experiment" as we use it here, and as it exists in the context of Bacon's meaning and use of the term in accord with its association and definition as they were intended in the early seventeenth century. Peter Anstey has elaborated on the meaning of experiment, which, in Bacon's time, was as much a philosophical as a methodological descriptor. Anstey submits "a simple concept of experiment. It comprises two necessary conditions, conditions which together are sufficient for an event to

For Bacon, the practice of initial observation and subsequent interpretation of nature is not only an heuristic enterprise, but, as such, is tantamount to an exercise of self-disciplined asceticism. I argue that since Bacon insists that natural inquiry must constitute an activity which is founded in goodness and to be carried out under the mindful aegis of sound moral virtue, he further requires that natural inquiry in its initial stages be a fundamentally individual, rather than collective, methodological undertaking.

Thus, my analysis departs from the existing scholarship of Lisa Jardine, Rose-Mary Sargent, Steven Shapin, and Simon Schaffer, who have sought to confirm Bacon as the progenitor of a fundamentally collective and collaborative approach to scientific inquiry and interpretation. In contrast, the thesis finds that Baconian natural inquiry begins as an individual endeavour and does so as a matter of epistemological necessity. Bacon's complex view of the necessity and weaknesses of the sense and intellect prescribes the necessity of a "President goodness" in the natural inquirer, which implies a labour of ascetic self-discipline. While Bacon includes collective participation amongst his precepts, this participation occurs in a wider epistemological context and occurs at a distance subsequent to the initial sensory-intellectual stage of inquiry.

Bacon's corpus bears ample evidence of his suspicions regarding collective consent as a validating factor in the establishment of what is accepted as a matter of fact.[8] What Bacon *does* desire is the full collective revelation of individual experimental and interpretive results and their conterminous contribution to both natural histories and to future inquiry.[9] He describes the juncture of individual and collective natural inquiry in fictionalised form as it occurs in Salomon's House in *The New Atlantis*. In the climactic episode of Bacon's well-known utopian tale, the Father of Salomon's House who, interestingly, has allowed a private conference for not more than one – Bacon's narrator – of the voyager guests, finishes his revelations of the Salomonic enterprises with a list of "the several employments and offices of

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constitute an experiment. First, experiments are interactions with nature. Second, these interactions have a heuristic structure. The term 'interaction' here is taken in the broadest possible sense and may include anything from sensory perception to active intervention." Anstey continues, advising that "[f]irst, it is best to think of interaction with nature as a continuum from active to passive with intervention at the active end and observation at the passive end. […] Second, in this view observation is taken to be experimental if it is aimed at knowledge acquisition." From Peter Anstey, "Philosophy of Experiment in Early Modern England: The Case of Bacon, Boyle and Hooke," *Early Science and Medicine* 19, no. 2 (2014): 103-132, esp. 105.

[8] Bacon is also as suspicious of empirical rigidity as he is of scholastic disputation (Bacon, *NO*, 153). The thesis contains considerable analysis of Steven Shapin's and Simon Schaffer's seminal research on behalf of the Sociology of Scientific Knowledge, in particular, Shapin and Schaffer, *Leivathan* and Shapin, *SHoT*.

[9] Natural histories are crucial to Bacon's epistemology at large and he addresses them *passim* throughout his works. For helpful overview, see Peter Anstey, "Locke, Bacon and Natural History," *Early Science and Medicine* 7, no. 1, (2002): 65-92. See especially, pp. 70-73.

our fellows."[10] In the scheme of offices, it is only the fourth office (there are nine in total), the Pioneers or Miners, comprised of three individuals, that actually engage in original experimental inquiry. As the Father of Salomon's House informs Bacon's narrator, the three Miners "try new experiments, *such as themselves think good* [italics mine]."[11] The remainder of offices before and following the Pioneers/Miners are, respectively, either engaged in collecting and drafting experiments according to extant natural histories and literate experiences or analysing the experiments of the three Pioneers.

However, the Father of Salomon's House then describes a noteworthy methodological juncture between the activities of the sixth and seventh offices of natural inquiry:

> [A]fter divers meetings and consults of our whole number [from the offices of compilers, inquirers, and interpreters of experiments in Salomon's House] to consider of the former labours and collections, we have three [individuals] that take care, out of them, to direct new experiments, of a higher light, more penetrating into nature than the former. These we call Lamps.[12]

The first line in this passage is significant: the Father of Salomon's House has identified the point at which solitary inquiry becomes collective. The transformation occurs when all of the members of the community within Salomon's House, "our whole number," meet "to consider of the former labours and collections" of the offices – and individuals – respectively dedicated to those tasks. Thus, Bacon indeed portrays the collective as a vetting entity, but one whose purpose only becomes appropriate *subsequent* to individual original inquiry and, not least, to the (in this case, three) individual inquirers' respective achievement of axiomatic knowledge.[13]

The vetting collective in Salomon's House does not act as an authority of natural truth, but, essentially, as advocate for the individual inquirers. The duty of the collective, of the Salomonic whole, is to apply the discoveries of the inquirers, to "direct new experiments of a higher light," not to judge the work of the dedicated inquirers to the end of classifying their discoveries as Truth or Lies.[14] In Bacon's view, only Time and Nature itself can perform such a task of assessment.

We will find that Bacon's precepts warn against the inevitable distortions of interpretive results on behalf of communitarian expectations. This is problematic for the paradigm of communitarian authority submitted by Steven Shapin, wherein methodology and

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[10] Francis Bacon, *Philosophical Works* 3, Vol. 3 of *The Works of Francis Bacon*, ed. James Spedding, Robert Leslie Ellis and Douglas Denon Heath (Cambridge: Cambridge University Press, 2011), 164.
[11] Bacon, *Philosophical Works* 3, Vol. 3 of *The Works of Francis Bacon*, 164.
[12] Bacon, *Philosophical Works* 3, Vol. 3 of *The Works of Francis Bacon*, 165.
[13] Bacon offers no suggestion that the three Pioneers/Miners collaborate amongst themselves. They would seem to be engaged in their own respective inquiries as a function of the office.
[14] Bacon, *Philosophical Works* 3, Vol. 3 of *The Works of Francis Bacon*, 165.

epistemology in the seventeenth century not only achieved their respective sanctions of legitimacy through the trust-bonds of a given community, but through the collective beliefs which define that community. Shapin asserts that "[f]or historians, cultural anthropologists, and sociologists of knowledge the treatment of truth as *accepted belief* [italics mine] counts as a maxim of method, and rightly so."[15] Bacon would protest and argue that accepted beliefs are received, not tested and ascertained through steady degrees of the experiment that he deems essential to the confirmation of natural truths. Bacon alerts his readers that "[t]he human intellect takes the conceptions which have won its approval (by general acceptance, credit, or simple charm), and pulls everything else into line and agreement with them."[16] It is belief that accommodates expectation while natural truths more often defy it.

We would thus be correct to suspect, on behalf of Bacon, the legitimacy of whatever power determines the substance and dynamic of the communitarian beliefs in Shapin's discussion. The fundamental risk in his (Shapin's) assertion is that natural inquiry is bound to end as apology for the shifting sensibilities and vicissitudes inherent in the motions of community trust and belief, rather than the reverse. Bacon insists that inquiry invest itself with an integrity that transcends the present and withstands the passage of time and, not least, the life of the inquirer. Thus, inquiry and the new knowledge it begets must also survive the intractable and importunate norms, habits, and synchronic collective identity of the community. This survival of knowledge is of significant thematic concern for the thesis. That survival begins with a proper moral foundation in the individual inquirer which, in its function, disciplines, or one might say, *cures*, the human mind. The disease of the mind is caused by the germs of idols and ultimately presents in symptoms of static and useless knowledge.

1.4 The Chapters: Bacon's Goodness as the Foundation of Useful Natural Philosophy

The current chapter serves only to introduce Bacon's concept of goodness as the primary appetitive material that enables Man to engage with nature and produce useful works and useful philosophy.[17] In Bacon's scheme, the methodological activities of natural inquiry proceed under the mindful aegis of the practitioner's own moral virtue; moral virtue, cultivated from goodness, is the mindful adjunct to the intellect and vice versa. Bacon associates the good in men with reason, though the former must be built upon the latter as a

[15] Shapin, *ShoT*, 4.
[16] Bacon, *NO*, 83.
[17] Bacon's analysis of *goodness* begins in the Seventh Book of *De augmentis*, Bacon, *OAPL*, 337. This thesis will visit that Book often.

labour of deliberate and voluntary self-discipline. Goodness is the material basis for the virtues which, in turn, inhabit and fortify the minds of individuals who have given themselves to the pursuit of useful, charitable contributions to human posterity. The thesis argument extends from Bacon's epistemological association of *goodness* with *usefulness* and the cohabitation in the mind of the moral virtues with the intellect.

In my approach to Bacon's reform of knowledge and natural inquiry, I will distinguish between what he requires respectively from the individual and from the community within the context of natural inquiry and the acquisition of useful knowledge. These are the respective functions of what Bacon designates the Individual/Self-Good and the Good of Communion.[18] Bacon does indeed espouse collective and cooperative aspects of natural inquiry, and he has demonstrated this sanction in the idyllic methodological and epistemological community of the fictional Salomon's House. However, the crucial sensory and intellectual work of natural inquiry, that is, the initial experimental/inductive stage of the inquirer's engagement with nature, must proceed as a solitary endeavour. Bacon admonishes that the inquirer must, in fact, be free of the importunate expectations and demands of the community. It is only in the quietude of solitary experiment and interpretation that the inquirer may advance at the steady pace dictated by the experiment and tend to the construction of axioms.

For Bacon, received notions imply the presence of tendentious communitarian expectations and beliefs. He emphasises authenticity and originality regarding experimental methodology that can only come from an exclusive marriage between the inquirer's mind and the universe. Bacon regrets that

> so far we have found no one with a mind steady and stern enough to resolve to rid himself of theories and common notions completely and to apply his intellect, scoured clear and level, to particulars anew. Thus human reason in its present condition is just a farrago and mass made up of a good deal of faith, a lot of accident, and a fair few infantile notions which we swallowed when young.[19]

Thus, we are given a view to the remedy inherent in Bacon's project for the reform of the practitioner. The inquirer subdues his own Idolic obstructions exacerbated by "theories and common notions" and veritably scours his mind of obstructions that have accompanied him from his youth. He must go beyond his faith (this presages a significant discussion in Chapter 2), build his inductive endeavour upon the primary material of goodness, and arm himself with the strength of his virtues. The inquirer, in Bacon's view, is tantamount to the ascetic contemplative. The former gives himself to a marriage with Nature as has the other to God.

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[18] Bacon's discussion of The Individual Good and the Good of Communion begins, Bacon, *OAPL*, 337.
[19] Bacon, *NO*, 155.

For Bacon, the epistemological task at hand is crucial and long overdue. The ages of learning, he regrets, are disparate and isolated.[20] He alleges that, in the stead of productive sciences, the world of learning subsequent to antiquity has dissipated into a human condition of prideful misapprehension wherein "we conjure up worlds, and dictate to nature like despots[, wherein] we want to have things our own way and in accordance not with the Divine Wisdom, or how we find the actual facts, but with the depths of our own folly."[21] He notes further that Man, by his nature, is driven to seek relief from doubt at the expense of natural truth: "the mind longs to leap up to higher generalities to find rest there; and after a short while scorns experience."[22] The inquirer must therefore be held in check by his duty to the correct path to *charity*, to the Good of Communion, and to what Bacon identifies as the "sons of science."[23] He must remain committed to a perpetual shadowing forth of his own goodness on behalf of his individual interpretive integrity, which in turn serves the benefit of humanity. His Individual or Self-Good represents the genetic matter which stimulates the full progress from the unclaimed reason of the individual human will to the final realization of charity in the Good of Communion. Bacon's Great Instauration is built upon this crucial primary material of individual goodness and the subsequent husbandry of the *virtues* in the mind.

En route to the delineation between individual and collective goodness and agency, Chapter 2 will explore *reason*, *goodness*, *moral virtue*, and *charity* as they exist and function as material substances in Bacon's view. He deems them the necessary qualities in forming the fundamental human potential to engage in meaningful natural inquiry and so produce new and useful knowledge. Not least, this chapter will offer analysis regarding the crucial and contentious issue of Bacon's theological intentions which either do or do not govern his philosophical precepts for natural inquiry. We will find that each of the four qualities mentioned above occupies, so to speak, native territory in both divine and profane contexts, and Bacon's place between the two provinces bears analysis. In this chapter, we begin to see

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[20] Bacon concludes that "of the twenty-five centuries that men's memory and learning run to, scarcely six which were productive of sciences and helpful to their advancement can be set aside and picked out . . . [f]or we can properly count only three revolutions or periods of learning: the first with the Greeks, the second with the Romans, and the third with us, the Western European nations." (Bacon, *NO*, 124-125).
[21] Bacon, *OFB*, vol. 12, 9.
[22] Bacon, *NO*, 71.
[23] Chapter 2 will address Bacon's concept of "charity," a term which he appropriates from Pauline scripture. However, Bacon treats it as a mark of human rather than divine endeavour. In the *Advancement of Learning* (1605), he submits charity as a noumenal condition of man rather than as a phenomenal manifestation of divinity: "*If I spake . . . with the tongues of men and Angels, and had not Charitie, it were but as a tinckling Cymball*; not but that it is an excellent thinge to speake with the tongues of Men and Angels, but because if it bee seuered from Charitie, and not referred to the good of Men and Mankind, it hath rather a sounding and vnworthie glorie, than a meriting and substantianall virtue." (Bacon, *AL*, 7). For "sonnes of science," Bacon, *OAPL*, 272.

the formative parameters that define Bacon's project to reform and prepare the *individual* to engage in meaningful natural inquiry. This reform begins in the individual human will.

Chapter 3 will examine Bacon's operative scheme for natural inquiry and the interpretation of nature, the formation of axioms, and the transmission of knowledge. Bacon contends that the cultivation of moral virtues from the inquirer's own prepared primary material of goodness must precede the engagement with and interpretation of nature. In the initial stages of natural inquiry, the first of which, as noted above, is a deep engagement with all pertinent natural histories, the human sense and intellect must work together without community pressures and expectations, and the integrity of virtues in the individual practitioner must govern the experiential interpretation of nature. Bacon argues that the husbandry of moral virtue and the inquiry into nature exist as equal under the operative aegis of charity. The chapter explores how and why the aspiration to an integrity of goodness and moral virtue and the commitment to the production of useful knowledge require the individual natural inquirer to engage in inductive inquiry without communitarian interference.

Chapter 4 delves into the definitions, material ontology, and active appetitive nature of Bacon's goodness and virtue. Bacon's reform of natural philosophy begins with what he denotes as Individual or Self Good. Its subsidiaries in the form of the virtues guide the inquirer's solitary conduct of his labours. Individual Good precedes the collective good, or, as Bacon calls it, the Good of Communion. However, it is only the former that allows for the proper interpretive relationship with nature on the part of the natural inquirer. While Bacon acknowledges that the collective manifestation of moral knowledge is important for the function of human society, he also recognises that it is inimical to natural inquiry. He insists that natural inquiry is first an active function of individual goodness and individual moral virtue, individual sense, and individual intellect. He further emphasises (and I will discuss) the discrepancy between the individual Contemplative and Active Good, the point that marks his departure from Aristotle. The Contemplative Good is useless to the beneficence of Man, the Active, eminently useful. The chapter explores this discrepancy.

The ontology of Bacon's individual goodness and moral virtue draws from his general matter theory, which the chapter further explores in detail (Chapter 2 also touches on this topic). Goodness possesses the material criteria of causal, appetitive, and active principles, as it does in nature. The virtues of the mind are analogous to the resulting material found in nature; they are akin to the natural products of *second causes*. However, Man's appetitive goodness is artificial while nature's appetitive goodness is inherent, but they are materially the same. Bacon's philosophy is dedicated to bringing these two realms into harmony on behalf of human charity. Bacon expressly refers to this relationship in his contention that

goodness is the sole human quality that approximates the active and causal power in nature. It is thus through the initial exercise of Self-good that the natural inquirer contributes to the Good of Communion and to the posterior benefit to humanity according to the inherent preservative tendency possessed by Nature.

Chapter 5 shifts the trajectory of the thesis to the posthumous transmission of Bacon's philosophy during the two decades following his death in 1626. Evidence shows that Bacon's moral project serves not only as the utilitarian aegis of natural inquiry, but as a template for decidedly non-scientific socio-political applications, as well. The chapter focuses on the reception of Bacon's philosophy by Samuel Hartlib and John Dury beginning in the late 1620s. Hartlib, in particular, is one of the first noteworthy advocates of Bacon's philosophy in the seventeenth century, and he (Hartlib) would appear to be the primary conduit of Baconian philosophy not just in Britain but in Europe from the late 1620s to the 1640s.

Accordingly, Chapter 5 further examines the specific influence of Gilbert Wats' 1640 translation of Bacon's *De dignitate et augmentis scientiarum* (1623) on the initiatives of Hartlib's, Dury's, and Jan Comenius's (1592-1670), educational, Protestant, and irenic reform. Their initiatives are defined by Bacon's notion of useful and practical philosophy. Neither Hartlib nor Dury, as Bacon's first notable proponents, are natural philosophers. However, they find Bacon's philosophy fundamentally applicable to their projects of progressive education and ecumenical reform.

Chapter 6 examines the direct influence of Francis Bacon's philosophical and methodological precepts on the life and work of Robert Boyle. Evidence strongly suggests that figures in the Hartlib Circle, especially Hartlib himself, are agents of Bacon's philosophy in the experimental motivations of a young Robert Boyle in the mid-1640s. Thus, I refute the historiographical claims that Bacon's influence had little to do with Boyle's entry into experimental philosophy. Analysis instead emphasises Boyle's enthusiasm for Bacon's methodological unification of the moral virtues and natural inquiry.

The transmission of Bacon through Hartlib to Robert Boyle serves as the thematic denouement of the thesis. What begins with Bacon ends with Boyle. I will examine a breadth of Boyle's writing from which we indeed glean a Baconian influence. Bacon's philosophical and practical campaign of sensory-based observation and interpretation of nature derives from a foundation of individual goodness, moral virtue, and the duty toward posterity and the beneficence to humanity in the form of charity, "the bond of perfection."[24]

[24] Bacon, *OAPL*, 361.

It is this aspect of Bacon's prescriptive philosophy that appeals to a young, pious, and impressionable Robert Boyle. The thesis contends Boyle's decision to pursue a life of experiment is built on his understanding that the practice of natural inquiry begins in the human primary material of goodness and its subsequent forms of the virtues. The chapter thus re-affirms the correction of historical scholarship that casts Boyle and his work as the products of gentlemanly trust and, in the larger sense, collective consent and communitarian beliefs. By ending with the narrative of Robert Boyle, the thesis affirms that Francis Bacon is a crucial figure not just in the methodological development of proto-modern science and its hallmark of collective cooperation, but, before any of that, in the realm of individual moral discipline on the whole.

Chapter 2: The Interpretation of Nature and the Material of Goodness and Virtue

2.1 Reason, Goodness, Moral Virtue, and the Baconian Mind

Recent historiographical analyses provided by Stephen Gaukroger, Sophie Weeks, and Sorana Corneanu address the Baconian relationship between the mutually beneficial endeavours to interpret and manipulate the natural world and, in so doing, improve an intrinsically "diseased" human mind.[25] Gaukroger focuses his argument on the humanist moral foundation of Baconian natural philosophy which itself is a participant in the familiar discourse of "the shift from esoteric to public knowledge."[26] In Gaukroger's Baconian model, knowledge is released from the alchemical habit of infertile stasis. The natural inquirer/interpreter is bound by epistemological duty to share his secrets and discoveries on behalf of collective charity and beneficence (i.e., the Good of Communion). Gaukroger confirms Bacon's fundamental connection between moral and natural philosophy and further illuminates the crucial link between both and his theory of matter.

Gaukroger invokes the common historiographic theme which finds Bacon's project tantamount to collaborative science, and thus that Bacon's moral philosophy and natural inquiry steer as one toward the end of facilitating public knowledge. Gaukroger's argument revolves around the dialectic wherein the independent pursuit of natural inquiry is encouraged and facilitated by the greater society which, in turn, reaps the benefit of those individual endeavours. This discourse is marked by the symbiotic relationship between individual inquirer and the collective acquisition of knowledge, which itself represents a fundamental relationship between the Self-Good and the Good of Communion. Gaukroger argues that the species of moral behaviour which facilitates the success of civil and social (or, political) balance shares a cause with the moral foundation of natural philosophy. Bacon indeed sees an operational relationship between natural philosophy and the mechanics of law; he further sees the interpretation of natural laws in parallel to the construction of civil law.[27] However, the thesis illustrates that human morality, like Bacon's two types of Good, manifests in two

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[25] Sorana Corneanu, *Regimens of the Mind: Boyle, Locke, and the Early Modern* Cultura Animi *Tradition* (Chicago: The University of Chicago Press, 2011), 19 ff.
[26] Stephen Gaukroger, *Francis Bacon and the Transformation of Early-Modern Philosophy* (Cambridge: Cambridge University Press), 7.
[27] See, for example, Bacon, *OAPL*, "The Eighth Book," esp. 366 ff.

respective, discrepant forms: one that pertains to the behaviour and conduct of the individual, and one that pertains to the effective administration and conduct of the collective.

Gaukroger's great contribution to the discussion of Bacon's moral project manifests in his analysis of Bacon's matter theory. He notes that Bacon's matter theory supplies profound insight into the "reform . . . of practice and practitioners of natural philosophy" in the seventeenth century at large.[28] He confirms Bacon's view that the reform of natural philosophy is, itself, an operation which must consider an all-encompassing mechanical scheme of matter. Bacon insists the natural inquirer place himself within the realm of nature and matter as an active observer and confront the paradoxical relationship wherein, as Bacon decrees, the "[practitioner] cannot govern nature save by complying with her."[29] Gaukroger confirms Bacon's epistemological innovation which establishes the natural inquirer as both product of and participant in a scheme of natural causes and effects.

Bacon does not build his theory of matter on mathematical or logical precepts. His matter theory proceeds from the mythic *parable* of Cupid, or Love.[30] This parable, as Bacon writes, "relates to the cradle and infancy of nature and pierces deep."[31] However, of particular salience to the thesis, Bacon continues: "This Love I understand to be the appetite or instinct of primal matter; or to speak more plainly, *the natural motion of the atom*; which is indeed the original and unique force that constitutes and fashions all things out of matter."[32] Matter, in Bacon's conception of it, possesses human characteristics, including instinct and desire.[33] However, since matter obviously precedes human beings, then it must be further so, in Bacon's view, that it is the human being who is the product, behavioural and otherwise, of original matter.

Sophie Weeks emphasises that "Cupid is a *person* with identifiable characteristics, by which Bacon intends [to convey] that *materia prima* has form *within* this chaos."[34] It is no flight of metaphorical fancy that Bacon assigns human characteristics to what Weeks identifies as the "*substratum*," which is "the atom itself," and the "*potency*," or "the power" of

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[28] Gaukroger, *Transformation*, 6.
[29] Bacon, *NO*, 195.
[30] Bacon, *DSV*, 729.
[31] Bacon, *DSV*, 729.
[32] Bacon, *DSV*, 729.
[33] In his famous work published in 1836, French cleric Joseph de Maistre expresses his impatience with Bacon's use of metaphors that elicit human emotions to describe natural and material phenomena. "There is nothing . . . more ridiculously sad than Bacon's visible pretence of applying to matter all the expressions that belong to feeling." Joseph De Maistre, *An Examination of the Philosophy of Bacon: Wherein Different Questions of Rational Philosophy Are Treated* (Montreal: McGill-Queen's University Press, 1998), 205.
[34] Sophie Weeks, "Francis Bacon and the Art-Nature Distinction," *Ambix* 54, no. 2 (July 2007): 111. Emphasis mine.

the atom.[35] Weeks provides the further crucial point that, "[a]s substratum, *materia prima* is unknowable, and so Bacon's concern is with the atom's power."[36] Bacon sees the human form of Cupid as the dedicated vessel which contains the original atomic power in nature. Bacon insinuates that the potency of primary matter has an intrinsically human analogue – namely, the potency of primary goodness – and thus, the human inquirer is not only *not* removed from natural processes, but virtually – and literally – embodies them. The inquirer is as much a product of and participant in nature as he is an artful manipulator.

Gaukroger reaffirms that, for Bacon, "[e]verything turns on matter theory, not just in the sense that natural philosophy is pursued through matter theory, but also because it is through matter theory that metaphysical theories about the nature of matter are incorporated into natural philosophy."[37] Gaukroger's assertion that Bacon's entire view of nature turns on matter theory is especially pertinent to the thesis analysis of Bacon's view on the material aspects of the human will and appetitive goodness. Invoking Weeks' "dual perspective" of matter, we can view individual moral virtues as analogous to the *potency* of the *substratum* of goodness.[38]

The human will corresponds to the original, parentless source (Chaos) of the potential for appetitive goodness in human beings. If the primary goodness of the individual serves as the "seductor" of the unclaimed reason that is inherent in the will, then that goodness may be viewed as belonging to the human equivalent of Bacon's third class of nature.[39] This class embodies nature as it is "restrained and moulded by art and human agency," wherein "nature is held in subjugation by the empire of man, for without man these things would never have been made."[40] Man must create and harness his appetitive power of goodness (in other words, he must act as his own Cupid) to seduce the reason of his will. Thus, Man's artificial act of creating the goodness which restrains and moulds the reason of his will approximates and imitates the appetitive goodness which is inherent in nature (nature has no will; for her, right reason and goodness are not separate traits). Goodness and its subsidiaries of the moral virtues are analogous to the active appetitive power of nature and manifestation of that power in Man, and their function is to influence Man's successful deference to posterity (nature does not require this scheme of influence).

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[35] Weeks, "Art-Nature Distinction," 107.
[36] Weeks, "Art-Nature Distinction," 107.
[37] Gaukroger, *Transformation*, 93.
[38] Weeks, "Art-Nature Distinction," 107.
[39] For "seductor" reference (from "seduceth"), see Bacon, *OAPL*, 333. For Bacon's three classes of Nature, see Bacon, *PAH*, 455.
[40] Bacon, *PAH*, 455.

Gaukroger provides a useful rubric by which we may analyse the Baconian project at large. He observes that Bacon's "method seems to be guided by a particular conception of just what natural philosophy is at the most fundamental level, namely a theory of matter."[41] In Bacon's view, all things in nature are the product of causes and thus behave according to appetitive material motion; they are driven to become effects. Bacon believes that cause and the motion of cause, or appetite, may be used to analyse the fundamental function and essence of matter. His recognition of the inherent causality in matter is evinced in his contention that, as Weeks illuminates, "matter hides within its folds the power to bring into being all potential worlds."[42]

Bacon asserts that the motive principles of matter have been given insufficient attention by philosophers, a neglect that has misled operative natural philosophy from its initial stages in human history. An example is his person-specific charge that

> Democritus, acute as he is in investigating the principles of bodies, when he comes to investigate the principles of motions appears to be unequal to himself, and to be unskilful; which likewise was the common fault of all the philosophers. And I know not whether this inquiry I speak of concerning the first condition of seeds or atoms be not the most useful of all; as being the supreme rule of act and power, and the true moderator of hope and works.[43]

In this passage, Bacon applies material principles to motion. Appetitive motion is the "first condition of seeds or atoms." However, more importantly, in his conflation of "hope and works," he implies principles of appetitive materiality to *hope* itself, which he includes in the same semantic space as "works." It is appetitive motion that binds Man and nature. Thus, we can say that the successful working husbandry of Man's individual appetitive goodness manifests not just in the mindful agents of moral virtues, but in the active principle of *hope*.

If goodness consists of the positive, active, and appetitive causal motion of matter, then it qualifies as matter. In Bacon's view, the defining principle of matter is *cause* and its existence is defined by *appetite*, or *motion.* Hence, that not all matter expressly exhibits discernible physical qualities in no way disqualifies it from ontological existence. Gaukroger elaborates that "[f]or Bacon, if not for Aristotle, the cause of material processes are themselves material – they are no different in kind than their effects."[44] Thus, the material qualities of goodness are evident not in terms of physical atomic mass, but through their material effects. Bacon considers the materiality of causal, active motion – the *potency*, to

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[41] Gaukroger, *Transformation*, 133.
[42] Weeks, "Art-Nature Distinction," 108.
[43] Francis Bacon, *Translations of the Philosophical Works, 2*, in Vol. *5* of *The Works of Francis Bacon*, ed. James Spedding, Robert Leslie Ellis and Douglas Denon Heath (Cambridge: Cambridge University Press, 2011), 422-423; see also, Weeks, "Art-Nature Distinction," 108.
[44] Gaukroger, *Transformation*, 135.

recall Weeks' analysis – to be the means by which Cupidic primary matter itself is built out of Chaotic matter.[45] Its materiality manifests not in the dimensions of physical objects, but as appetitive motion. Cupid's *act* of shadowing forth matter represents material cause. In the case of Man, the act of the husbandry of his own individual goodness thus instils the primary matter of that goodness with *material potency*. In this way, Man emulates nature's material potency. We thus return to Bacon's words which open this thesis:

> For if two things be suppos'd, *that the ends of Actions be Honest and Good; and that the Resolution of the mind, for the pursuing and obtaining them, be fixt, constant, and true unto such ends*; it will follow that the mind shall forthwith transforme and mould it selfe into all virtues at once. And this is indeed an operation, which resembleth the *work of nature.*[46]

Bacon's matter theory is concerned at its core with the *material of motion* as that motion extends from causes. In the context of the quote above, the "ends of actions" determine the "worth" (again, a term that applies only to the realm of Man and *not* nature) of the active motion. The principle of cause qualifies as the basis for the assessment of appetitive matter and cannot be excluded from that assessment. In Bacon's view, physical traits or features provide insufficient data. These limited criteria apply only to appearances and do not account for the intrinsic active and appetitive potential of matter.[47]

Gaukroger points out that Bacon's "theory of matter is embedded in a metaphysics of reality versus appearances in a way that mechanics is not."[48] Thus, the natural inquirer must "[go] beyond merely surface appearances to get at the underlying reality."[49] Gaukroger submits that "the *potentialities* and *tendencies* of Aristotle's physical theory seem to inhere in matter without being physically identifiable in their own right [and] are present at the microscopic level in a physical way."[50] For Aristotle, the study of potentialities and tendencies is a means to study physical qualities of invisible things. Likewise, Gaukroger notes "that Bacon never imagined that we would have direct access to this level of nature [viz., the microscopic level]."[51] That invisible matter is possessed of material qualities by virtue of its appetitive motion is crucial to Bacon's views on the primary goodness of individual human beings and the subsequent mindful and bodily forms of the moral virtues.

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[45] Weeks, "Art-Nature Distinction," 107.
[46] Bacon, *OAPL*, 360.
[47] In his 1612 essay, "Of Beauty," Bacon offers an enlightening allegory of his views on physical features. He writes, "A Man shall see Faces, that if you examine them, Part by Part, you shall finde never a good; And yet all together doe well. If it be true, that the Principall Part of *Beauty*, is in decent Motion, certainly it is no marvaile, though *Persons in Yeares*, seeme many times more Amiable." Bacon, *Ess*, 133.
[48] Gaukroger, *Transformation*, 133-134.
[49] For enfolded power, see Weeks, "Art-Nature Distinction," 108 ff; Gaukroger, *Transformation*, 134.
[50] Gaukroger, *Transformation*, 135. Emphasis mine.
[51] Gaukroger, *Transformation*, 135.

Materiality is to be assessed according to what Bacon calls "moving principles of things."[52] Bacon regrets that these principles have thus far been "treated for the most part only in passage; so that it passes all wonder to see how carelessly and loosely the greatest and most useful thing of all is inquired and handled."[53] These principles are not to be confused (as Gaukroger warns) with "Galilean kinematics," wherein "all bodies have a component of uniformly accelerated motion downwards, and that this is the only universal component of uniformly accelerated motion, [for Galileo] is not in any sense showing that uniformly accelerated motion is the reality underlying the appearances."[54] Gaukroger's observation separates Galilean kinematics from the material potential for activity that underscores Bacon's matter theory. Galileo's observations make no provision for the enfolded, appetitive power of matter. According to Bacon's view, Galilean kinematics would only describe the nature of external *dynamic* forces and offer nothing in the way of ontological assessment of matter itself. Again, Bacon's concept of material motion is not an approach to movement. Bacon is interested in motion as both property and principle of all matter and matter's subsequent material forms. The appetitive potential for and potency of goodness exists as material cause not only in human beings and not only in living things, but in all things natural or artificial, living or inert (here, we are approaching Bacon's invocation of Stoic right reason, discussed below in this chapter). Bacon asserts that "*the Artificialls differ not from Naturalls in Forme or Essence; but in the Efficient only*."[55]

Material motion begins with the enfolded potential of cause contained in each atom. In the Galilean model of dynamic motion, as addressed by Gaukroger, nothing can be revealed about matter's causal principles. Bacon asserts that knowledge about things cannot be satisfied by a survey of their physical ingredients. He contends that "with a view to action and the enlargement of the power or operation of man it is not enough nor indeed of any great use, to know of that things consist, if you know not the ways [causes] and means [motions] of their mutations and transformations."[56] The physical features of things reveal only agglomerations of inert ingredients rather than the causal essences of matter and nature. Bacon asserts that

> with a view to action and the enlargement of the power or operation of man it is not enough, not indeed of any great use, to know of what things consist, if you know not

[52] Bacon, *Translations of the Philosophical Works 2*, in Vol. 5 of *The Works of Francis Bacon*, 424.
[53] Bacon, *Translations of the Philosophical Works 2*, in Vol. 5 of *The Works of Francis Bacon*, 424
[54] Gaukroger, *Transformation*, 134.
[55] Bacon, *OAPL*, 80.
[56] Bacon, *Translations of the Philosophical Works 2*, in Vol. 5 of *The Works of Francis Bacon*, 424. Further, in *NO*, Bacon provides an extensive list of what he has named *Instances of Wrestling and Ascendancy* which are made up of nineteen types of "motion." (Bacon, *NO*, 382-417). These are contained in the lengthy Aphorism 48 in *THE SECOND BOOK OF APHORISMS* [. . .] At the outset of the Aphorism, Bacon explains that "the motions and exertions of bodies are no less composed, decomposed and intermixed than the bodies themselves." (Bacon, *NO*, 383).

> the ways and means of their mutations and transformations, and the forces which work within and without it. For to take an example from physicians (from whose notions these celebrated inquiries concerning the principles of things seem to have come), is a man who knows the simple ingredients of treacle, able for certain to make that compound? Or when a man has by him a proper description of the materials used for making sugar, glass, and cloth, would you suppose him on that account to possess the art of preparing and making them? [57]

Thus, the hinge of both Baconian matter theory and his natural philosophy is causal motion, without which mass and appearance are epistemologically useless. The behavioural motion of matter reveals the unique activity of existence by which a thing in nature exists, whether it be iron or animal. Thus, we must examine Bacon's materialist provisions in terms of causation. Bacon's materialism is concerned not so much with what matter *is*, but what it *does*.

Bacon finds physical atomism confining and insufficient. However, he also rejects the assessment of material motion based on externally-based forces which provoke mere dynamic animation in otherwise *dead matter*. I find this latter point to be especially salient. Bacon distinguishes between motion as a principle in and of itself (viz. gravitational-dynamic motion) and motion as an intrinsic, causal quality of material. Since Baconian motion reveals, or rather contains, the essence of a particular object, then that same motion itself may be examined as having material qualities. However, Bacon does not accept the behaviour of objects under the influence of external dynamic motion as, itself, motive principle. Since motion is not necessarily tantamount to physical *movement*, we must identify what exactly Bacon considers it to be.

Bacon's motion is not manifest as an act of travel, with which Bacon dispenses as the mere "express[ion] by the motion of carriage," but in the possession of *appetite*.[58] That all things are possessed of idiosyncratic appetitive tendencies and behaviours – essential causal motions – is a central ontological pillar in Bacon's approach to material existence. He urges that

> the principles, fountains, causes, and forms of motions, that is, the appetites and passions of every kind of matter, are the proper objects of philosophy; and therewithal the impression or impulses of motions, the restraints and reluctations, the passages and obstructions, the alternations and mixtures, the circuits and series; in a word, the universal process of motions.[59]

It is with "the universal process of motions" that we find our point of entry into the discussion of Baconian individual goodness. It embodies, so to speak, *appetitive motion*.

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[57] Bacon, *Translations of the Philosophical Works, 2*, in Vol. *5* of *The Works of Francis Bacon*, 424.
[58] Bacon, *Translations of the Philosophical Works, 2*, in Vol. *5* of *The Works of Francis Bacon*, 424.
[59] Bacon, *Translations of the Philosophical Works, 2*, in Vol. *5* of *The Works of Francis Bacon*, 426.

Sorana Corneanu has assessed the precepts of Bacon's natural philosophy as stimulants not just to the advancement of knowledge, but to the improvement of the human mind and so human behaviour. However, for Corneanu, the active motions in nature, rather than directly corresponding to the active motions of individual human goodness and morality, instead provide the human mind the opportunity to achieve an improved state in that they serve as objects of study in the activity of natural philosophy. The mind is led through non-material means to a heightened moral state. In Corneanu's analysis, goodness and moral virtues are stripped of their motive, and thus their material, principles. Goodness and the moral virtues are a collective response to the concentrated study of nature, rather than an actor within a context of material coexistence between Man and nature. In a sense, they are the Chaotic matter mysteriously created by the creative hand of knowledge itself.

Corneanu's analysis enables the true point of departure I intend for my thesis even as the two coexist in slight disagreement. Corneanu shows that Bacon's programme is one that holds "nature [to be] . . . one of the domains of inquiry where the pursuit of truth and of a fortified mind comes into play."[60] She correctly treats Bacon's intentions regarding his natural and moral philosophy as the attempt to construct the means by which Man may better understand and bend nature to his own uses. In Corneanu's analysis, that endeavour also applies to the improvement of the human mind. Thus, Bacon's precept of *utility* would apply not just in the "scientific ability to control nature," but also to the end of "Christian-humanist philanthropy and to the mending and improvement of the human mind."[61]

Corneanu places moral virtue amongst the cures for what Bacon has diagnosed as "'diseases' or 'distempers' of the mind."[62] In addition to "religious meditations" and the acquisition of knowledge as processes of improvement which exert "bearing on natural philosophy," Corneanu includes "moral advice" as "an integral part of a paideic, virtue-building scenario" which is applied to the removal of the impediments to Man's intellectual powers.[63] She respectfully departs from Gaukroger's analysis, conceding that he "has developed a powerful argument according to which Bacon refashioned natural philosophy by modelling it on humanist natural philosophy."[64] However, significantly, Corneanu does not take into account Gaukroger's claim that Bacon's epistemological approach to natural philosophy is fundamentally based on his (Bacon's) theory of matter. This is problematic, since Bacon's matter theory, far-reaching and extending beyond physical dimensions,

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[60] Corneanu, *Regimens*, 3.
[61] Corneanu, *Regimens*, 17.
[62] Corneanu, *Regimens*, 15.
[63] Corneanu, *Regimens*, 15
[64] Corneanu, *Regimens*, 15

contains the appetitive materials of goodness and the moral virtues. Sophie Weeks rightly reminds us that Bacon's "is an extreme form of materialism."[65] Bacon must certainly be one of the first philosophers in any age to place the potential for Man's ability to thrive in his own moral and political milieu as an endeavour fully dependent on his ability to develop an understanding of nature. This comprehensive achievement can only come to pass when Man recognises his own appetitive causes in the motions of natural phenomena. We might respond to Corneanu that Bacon's improvement of the mind *helps* to reorient Man as a participant in the appetitive material world; it is not the *object* of the search.

Thus, the thesis requires a greater distance of departure than Corneanu has taken in regards to moral virtue and the improvements of the mind. She expands on the role played by the "education of the powers of the mind which […] underlies [Bacon's] natural no less than his moral philosophy."[66] She pushes her argument constructively forward, uniting the Baconian courses of natural and moral philosophy into "a more fundamental doctrine, one concerned with impediments and the regimens of whole mind with all its faculties."[67] She identifies Bacon's intent to "bridg[e] the moral and epistemological fields."[68] She allows that moral virtue does not stop at the threshold of knowledge acquisition, but proceeds as an integral facet in the dialectic between the improvement of the mind and the achievement through Baconian precepts of a quantifiable improvement of Man's estate. Thus, Corneanu helpfully and usefully brings moral virtue into the theatre of Baconian methodology and further into the crucial Baconian epistemological constituent of knowledge transmission. She writes that

> Bacon envisages his new logic as a discipline of observation, judgment, and emotions, one that involves a reordering of the motions of the individual's mind and that is conceived as a personal trial; the succession of inquirers that ensures the communal transmission of knowledge is envisaged as a guarantee of an *organic* growth of knowledge.[69]

Corneanu's paradigm correctly describes the active motion of moral virtue as well, a motion that begins in the individual and travels to the collective.

However, conspicuous by its absence in Corneanu's discussion of knowledge is the signature Baconian issue regarding the understanding of nature. Knowledge can only be as pure as the sensory-intellectual machinery (and the Idols within it) which mediate this understanding. Man's proper preparation of his interpretive machinery is fundamentally

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[65] Weeks, "Art-Nature Distinction," 106.
[66] Corneanu, *Regimens*, 17.
[67] Corneanu, *Regimens*, 17.
[68] Corneanu, *Regimens*, 28.
[69] Corneanu, *Regimens*, 18.

necessary. This preparation begins with the initial husbandry of Man's own appetitive material powers. Corneanu provides elucidating analysis of the "internal" and "external" behaviours of moral virtue. In particular, she shows how Bacon "extends [the] domain" of internal moral virtue from "the will and affections . . . to the 'Arts Intellectual', which deal with understanding."[70] She illuminates a crucial aspect of Bacon's philosophy as she directly links the cultivation of moral virtue to the pursuit of knowledge.

However, Corneanu may perhaps take a liberty in her contention that the goodness of Baconian moral virtue, at its operational root, is motivated by the endeavour to "[imitate] God's goodness."[71] Postlapsarian Man does this, according to Corneanu, by dedicating his knowledge to charity. Invoking Bacon, she writes, "the rightful pursuit of knowledge is such as to accomplish the two facets of charity: the 'benefit and use of men', and the government and fortification of the mind – which is also to give account for a divine gift, the gift of reason."[72]

While my analysis accepts Corneanu's assignation of "reason" as a divine gift (insofar as reason is inherent in the will), it takes issue with her assertion that goodness serves as an "imitation of divine wisdom," that is, that goodness is intrinsic to reason, whether that reason is divine or human. I refer here to Bacon's discussion of the "*degrees of good*" in the Seventh Book of *De augmentis*.[73] He describes the "Comparative" good, which houses "those infinite disputations and speculations touching the supreme [viz., divine] degree thereof, which they termed *Felicity, Beatitude*," or the "*highest good* (the Doctrines of which were the Heathens Divinity)."[74] Bacon's identification of these synonymic variants as representing the highest potential for goodness is accompanied by the parenthetical proviso that these are illusory, even presumptuous, figments of a "heathen Divinity." Thus, almost paradoxically, Bacon finishes this discourse with the assertion that these doctrines, which represent a fundamental existential dilemma in Man, "are by the Christian Faith, taken away and discharged."[75]

In *Valerius Terminus*, he elucidates where Man belongs in this tricky area, tricky because if Man is to aspire to the best good, how can he not look to the divine goodness of God as an example, even if it is out of his reach? Bacon contends that there is a difference between goodness and the aspiration to power which Adam would have done well to remember. Man in the collective sense must understand that if God has cast Man out of the

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[70] Corneanu, *Regimens*, 29.
[71] Corneanu, *Regimens*, 32.
[72] Corneanu, *Regimens*, 33-34.
[73] Bacon, *OAPL*, 336.
[74] Bacon, *OAPL*, 336.
[75] Bacon, *OAPL*, 336.

divine realm, He has also given Man the opportunity – the potential – to be released from the covetousness of divine power that caused the fall of Adam and Eve. Bacon explains that Man (or Adam, to be precise) "being in his creation invested with sovereignty of all inferior creatures […] was not needy of power or dominion; but again, being a spirit newly inclosed in a body of earth, he was fittest to be allured with appetite of light and liberty of knowledge; therefore this approaching and intruding into God's secrets and mysteries was rewarded with a further removing and estranging from God's presence."[76] We are presented here not just with the recollection of Adam's error, but of the subsequent inherent futility in the human attempt to imitate or presume to aspire to divine goodness. Bacon paints Man (that is, Adam) as having been created with an inherent "appetite" for knowledge by virtue of the very earth of which he (Adam) was made. Thus, the quest for *useful* knowledge should overrule the lust for power promised by the *divine* knowledge of Good and Evil, a threshold both Adam and Eve were coerced by Satan to cross. In fact, Man's pursuit of what Bacon calls the "similitude of God's goodness" aligns the former with his (Man's) greatest potential for success in God's created world of second causes.[77] Bacon, even if unwittingly at this point, alludes to the very material appetite that guides the human pursuit of useful knowledge. "Love," he writes, "is nothing else but goodness put in motion or applied."[78] Thus, the love of God that Man pursues is equal to the love – i.e., the appetitive goodness – by which Nature itself sustains itself.

However, Bacon again draws a direct correlation between the divine creation of Man and the divine creation of nature by virtue of the very material from which both are made. If Man indeed has dominion over nature, it is a power he no longer wields as a colleague of God. Man's dominion is now a function of his intellect and his fundamental imperative to apply his art on behalf of his survival. Bacon emphasises that, in the postlapsarian context, both humans and nature are made from the *same* material and thus possess the same properties of causal motion. Man is now a product and colleague of *nature*.

What separated Adam in the material sense from the creatures he was given the authority by God to name was Adam's *efficient cause*.[79] Adam was made from the earth but he was made by the creative, appetitive hand of God. In this sense, though he was made of earth, Adam was a divine being. After the Fall, Man's efficient cause changed. The event of

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[76] Francis Bacon, *Philosophical Works, 3*, Vol. 3 of *The Works of Francis Bacon*, 217.
[77] Francis Bacon, *Philosophical Works, 3*, Vol. 3 of *The Works of Francis Bacon*, eds. James Spedding, Robert Leslie Ellis and Douglas Denon Heath (Cambridge: Cambridge University Press, 2011), 217.
[78] Bacon, *Philosophical Works, 3*, Vol. 3 of *The Works of Francis Bacon*, 217.
[79] Pursuing the Protestant influence on natural inquiry, especially that espoused by Bacon, Peter Harrison suggests that by the seventeenth century, the erstwhile "allegorical interpretation" of Adam's dominion over the creatures of Earth described in Genesis "took on an unprecedented literal significance." See Peter Harrison, "Subduing the Earth: Genesis I, Early Modern Science, and the Exploitation of Nature." In *The Journal of Religion* 79, no. 1 (January 1999): 86-109, 96 ff. https://www.jstor.org/stable/1207043.

the Fall recast Man, as Robert Boyle will observe and agree, as an "undertaking animal."[80] Man is no longer the direct product of divine material cause. He is possessed of the same appetitive potential that is in nature. However, unlike nature, Man is saddled with an intellect, which, because of its capacity for reason and logic, is vulnerable to idols that distract and divert his efforts to acquire and apply knowledge. Man must thus take measures to activate his own source of appetitive power to condition his mind as a useful tool. This power, artificially made from the primary matter of goodness, is born not of intellect or even knowledge itself. It manifests as the appetitive deference to posterity. Only when an individual human undertaking animal achieves that deference can his interpretive abilities function chastely as do the positive forces in nature and lead to works of utilitarian value.

The futile – and perhaps even blasphemous – endeavour of one to know divine goodness is akin to the endeavour of one to achieve knowledge of the unknowable Chaotic efficient which begets appetitive matter. That is, it is akin to the futility of attempting to know the unknowable source of the inherent reason in the will. Again, it is Bacon who relieves us of this burden, arguing that the inevitable agony of failure to know the unknowable is "by the Christian faith removed and discharged."[81] If God forbids Man to seek the forbidden knowledge of Good and Evil as he did Adam and Eve, then Man must not endeavour to know, much less attempt to imitate, the highest good, which is the exclusive substance of divinity. "[S]o must we all," Bacon advises, "being so taught by the Christian Faith, acknowledge our selves to be but children and in our Minority; and think of no other felicity, than that which is in hope of the future world."[82]

Bacon's cure for the diseased mind begins with Man's acceptance that he is an inherently fallible instrument. However, simultaneously, humanity has nonetheless been tasked with discovering truths amongst the second causes of nature so that it may fulfil its duty to arrange itself properly under the aegis of *hope*, which is the earthly twin of faith. Both hope and faith are imbued with a deference to posterity and are thus, like the moral virtues, forms cultivated from individual primary goodness. Bacon reassures postlapsarian Man that

> [f]reed therefore by happy fate from this doctrine, which was the *Heathen's Heaven* […] wherein without doubt, they [erstwhile moral authors] attributed a higher elevation of man's Nature, than it was capable of, . . . we may certainly with lesse losse of sobriety and Truth, receive for most part, the rest of their inquiries concerning the doctrine of the *Platforme* [of the degrees of good].[83]

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[80] Robert Boyle, *Unpublished Writings, 1645-c. 1670*. Vol. 13 of *The Works of Robert Boyle*, eds. Michael Hunter and Edward B. Davis (London: Pickering & Chatto, 2000), 129.
[81] Bacon, *OAPL*, 336.
[82] Bacon, *OAPL*, 336.
[83] Bacon, *OAPL*, 336.

Bacon then provides humanity with its proper scheme of priorities as he corrects the misplaced efforts of the erstwhile moral authorities:

> [I]f before they [these moral authorities] had address'd themselves to the popular and receiv'd notions of *Virtue, Vice, Paine, Pleasure,* and the rest; they had stayd a litle longer and had searched the *Rootes of Good and Evil, and the strings of those Rootes*; they had given in my judgement a great light unto all which might fall into enquirie afterwards: especially if they had consulted as well with the *Nature of things, as with the Axioms of Moralitie*.[84]

Here, Bacon directly links the nature of things and moral axioms in a context of formal inquiry. However, further on in the same passage, he conveys an even more crucial priority: "wee will . . . endeavour to open and cleare the springs of *Morall habits,* before we come unto the doctrine of the *Culture or Manurance of the Minde,* which we set down as DEFICIENT."[85] As a further response to Corneanu's scheme, in Bacon's endeavour to understand nature, the inquirer achieves an integrity of goodness and moral virtue that precedes both the acquisition of knowledge *and* the cure of the diseased mind. Before the mind can be assigned the task of knowledge acquisition, Bacon insists that Man's moral fountains must be cleansed and purified.

The placement of moral priorities amongst the initial tasks of the inquirer leads my argument to a further departure from Corneanu's analysis. She correctly cites Bacon's "identification of . . . self-adoration . . . as the main obstacle to true knowledge of the world."[86] It is a "traditionally moral and theological vice" upon which Bacon builds his case against the "unsound complexion of the mind."[87] She rightly conveys that Bacon sees self-adoration as the primary reason that "philosophers disdain mean, vulgar experience and fall in love with speculation and generalities."[88] As we have noted above, Corneanu weights her argument towards an apparent Baconian initiative in which the cure of the mind's distempers is the primary goal of knowledge acquisition. The danger in this is that such a goal might itself be seen by Bacon as, itself, an "affectation." We must remember that Bacon describes natural inquiry as a potentially excruciating experience for the inquirer, the object of which is not the improvement of the mind per se, but the discovery of truth and the transmission of that discovery intact to the pool of human knowledge. Natural inquiry implies the sacrifice of the seeker's present to a posterity that he will not live to see. Bacon lauds the "men of Capacity and Comprehension about the vulgare, [who] yet consulting their own Credit and Reputation

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[84] Bacon, *OAPL*, 337.
[85] Bacon, *OAPL*, 337.
[86] Corneanu, *Regimens*, 21.
[87] Corneanu, *Regimens*, 21.
[88] Corneanu, *Regimens*, 22.

have submitted themselves to the over-swaying Judgement of Time and Multitude."[89] Such is the destiny of the natural inquirer. The men of capacity do not submit themselves to the promise of a cured mind any more than they do to public accolades.

The improvement of the mind is, like beneficence to Mankind, ultimately a by-product not of successful experiment in natural inquiry, but of the successful discipline of the natural inquirer in his capacity. This discipline begins on an individual basis with the private cultivation of material goodness. As I have noted above, Bacon assigns the final authority of inquiry to the "over-swaying Judgement of Time and Multitude." The actual inquirer at any given stage is, himself, expendable in the greater process of discovering truths. He is only worth the light of his axioms. It is his record of attempt, embodied in what Bacon calls the Arts of Discovery, that must survive to be transmitted to posterity.[90] Only then can the endeavour of natural inquiry be made useful and charitable.

Bacon's object is to construct a method of operative natural philosophy that is impervious to the obstruction and invasions of a fallible and even pernicious intellect. Disingenuous motives are a constant threat to inquiry, and so to the beneficence of Man. Bacon's placement of goodness as the fundamental appetite in the search for natural truths reveals his effort to instil a self-abnegating *impartiality* – not to be confused with empirical discipline – into the lone human inquirer. This impartiality corresponds to that of nature in her own processes. Bacon thus seeks the means for the human inquirer to emulate, rather than imitate, nature. Nature is the exemplary model of positive action because she is virtually free of the distempers which afflict the human intellect. Nature has no diseased mind to cure. Man must use his artificial appetitive goodness in order to stand on equal footing with nature. It is only through this stance that he can truly understand her.

Thus, my argument proceeds beyond Corneanu's analysis. Bacon's object is not to use goodness and moral virtue as means to effect the mind's improvement, per se. The cure of the mind's distempers is a by-product of inquiry, not an end in itself. However, as we will see in the discussion of Bacon's literary transmission, the mind of any given inquirer need not necessarily improve for his inquiry to achieve posterior value. In fact, the inquirer becomes a participant in his own inquiry as he is a participant in nature. He is not an authority, but rather a scribe. [91] He demonstrates his useful contribution not in the pronouncement of mechanical success, or even by virtue of his improved mind, but in the solitude of the sensory, intellectual, and literary knowledge it is his duty to transmit to posterity. This is the scheme of

[89] Bacon, *OAPL*, 9.
[90] See Bacon, *OAPL*, 226.
[91] Bacon, *PA*, 260-261.

natural philosophy which corresponds to one of ascetic duty and humility; the inquirer offers himself in a sacrificial effort to unlock nature's secrets though he may never himself know the value of his sacrifice.

Gaukroger and Corneanu pursue valid discourses. Bacon's *fruits* and *light* of knowledge nourish the improvement of both the collective human estate and the individual human mind. However, much as Corneanu's position furthers rather than refutes Gaukroger's, I acknowledge but advance Corneanu's argument. I identify a more epistemologically dramatic intent on Bacon's part than to join natural inquiry with mindful improvement. I assign Bacon's appetitive goodness a more independent and prepotent status regarding operative natural philosophy than either Corneanu or Gaukroger have done. In Bacon's view, if humanity is to properly carry out the interpretation of nature, which requires that the obstructive Idols of the mind be subdued and subjugated to that end, then goodness must be cultivated as the first efficient, the primary material, which underlies both sensory and intellectual experience in the process of epistemological and methodological engagement with nature. Rather than an end, the primary matter of goodness and the subsequent forms of the moral virtues collectively represent a methodological precept, a preparatory condition without which the acquisition of natural knowledge cannot be methodologically or epistemologically sustained.

It is thus that this thesis contends, perhaps controversially, that this view of goodness and virtue does not signal a religious context to Bacon's provisions. His project is a product of his matter theory. As Bacon considers all in existence a function of the Chaos-Cupid progression of matter, he proposes that Man construct his individual goodness as a means to invoke the active and positive forces of nature. Man is not to imitate divine goodness, a futile and, as evidenced by the Fall, dangerous flight. Goodness in the Baconian sense must be a human, not divine, pursuit.

Bacon notes that Man and nature occupy the same realm of Creation. Man, while blessed and cursed with an intellect, is yet a facet of created nature where once he was a direct product of divinity. Man's appetitive goodness serves his Christian duty in the same way that it serves the interpretation of nature: to focus his inherent reason toward posterior and charitable ends. In *The Advancement of Learning* (1605), the *de facto* opening fanfare of the Great Instauration, Bacon makes clear the human place in the scheme of Creation. The attempt by Adam and Eve to appropriate the divine knowledge of Good and Evil is itself the cause of Man's fall. Bacon defends his project of knowledge reform while he simultaneously refutes its potential infringement on Man's Christian knowledge and, finally, rationalises the Fall:

> [i]t was not the pure knowledg of nature and vniuersality, a knowledge by the light whereof man did giue names vnto other creatures in Paradise, as they were brought before him, according vnto their properties, which gaue the occasion to the fall; but it was the proude knowledge of good and euill, with an intent in man to giue law vnto himselfe, and to depend no more vpon Gods commaundements.[92]

In this passage, Bacon reminds his readers that postlapsarian Man has been granted the dominion of knowledge regarding the native province he shares with Creation, not with the *Creator*. Man's inherent gift of reason and his potential for goodness are given by God as postlapsarian tools of settlement in that province. This *potential* for the successful cultivation of goodness from the unclaimed reason of the will has been provided by God. Thus, Man, through his own efforts of husbandry, is to use these tools and his artistic capacity to construct his own means to a true relationship with God through a relationship to nature

2.2 Right Reason, Goodness, Moral Virtue, and Charity: Bacon's Place Amongst the Divine and Profane

2.2.1 Prefatory Analysis

The debate amongst historians of science regarding the degree to which Bacon intends or does not intend his project to be a work founded in and confirmed to the doctrines of his own Christian (and, particularly, Calvinist) faith, and the degree to which he was religious to begin with, remains vibrant. As such, I find it necessary to examine Bacon's formal invocations of the terms "right reason," "goodness," "moral virtue," and "charity" since the current analysis relies on the semantic clarity of these terms and concepts in both religious and epistemological contexts. In the case of "right reason," I question the degree to which the adjective *right* implies the substance of the divine hand of the *Christian* Creator, a hand thus diametrically opposed to a *wrong, profane,* and *evil* influence in the reasonable realm of the human will, or, as I interpret Bacon's view, whether the term implies a meaning more to do with *balance*.[93] The modes of argument are related. Below, I discuss how Bacon's intent is to summon "right reason" as it existed in the pre-Christian Stoic sense that is distinct from the right reason as manifest in what many scholars assert are varying degrees by which Bacon seeks to advance Christian scripture, and particularly combination of scripture and Stoicism espoused by Augustine of Hippo and John Calvin.[94]

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[92] Bacon, *AL*, 6.
[93] See Bacon's invocation of "right reason" below at the outset of Section 2.2.3.
[94] In his venerable survey of right reason in the English Renaissance, Robert Hoopes writes plainly about Bacon's historically unique position *qua* reason and faith:

Peter Harrison has argued that Bacon's philosophy and epistemology, in keeping with seventeenth-century notions of reason at large, draws on an Augustinian refraction of Stoic philosophy. Harrison points to Cicero's *cultura animi* in particular as the source of the Augustinian response that stimulated the "flourishing of Neostoicism" which began to take hold in Europe at the end of the fifteenth century (we recall Corneanu's treatment of the *cultura animi* above).[95] Harrison cites Bacon's invocation of "Christian charity as a key virtue" of the *cultura animi* which "sides [Bacon] with Augustine against the [purely] classical elevation of wisdom as the goal of intellectual and moral endeavours."[96]

Harrison's will prove to be a moderate claim in the way of Bacon's theology. While the former allows that, "Bacon's reworking of the virtue of charity . . . extends to human welfare generally . . . for which advances in learning are proposed as a means," he nonetheless further contends that "Bacon combines a *Protestant* notion of vocation and the sanctity of mundane professions with a renaissance elevation of the *vita activa* and the philosopher's civic responsibility."[97] I assert, however, that if Bacon has indeed combined a definitively Protestant notion with the *vita activa*, he has done so unconsciously and *despite* his intent to keep his precepts for the advancement of learning secular. Bacon advocates the separation of theology from natural philosophy and vice versa as a means to preserve the epistemological and substantial integrity of *both.* Such a separation indicates nothing about Bacon's own piety, which, in my view, can only remain a point of conjecture for all sides of the argument.

Laura Georgescu finds Harrison's Augustinian refraction of Stoic philosophy insufficient as an influence on Bacon. Harrison, she regrets, seems to be arguing on behalf of a Baconian "method of knowledge production which is autonomous, free of any theological assumptions."[98] In fact, Harrison is doing no such thing, as we have already seen above.

"Until the seventeenth century . . . the reachings of reason are subordinated largely in the interests of preserving faith. With Bacon, however, whatever his pious protestations, the reverse is the case. As numerous critics have pointed out, Bacon was far less concerned to keep religion uncontaminated by science than he was to keep science unadulterated by the superstitions and prejudices of theology. Confusion of the two areas, he insists everywhere, has done all manner of harm in blocking the advancement of learning, whose end is to establish the empire of man over nature. Accordingly, Bacon prays (from the point of view of the humanistic tradition, with unintended irony) that his [and the minds of others] mind may be purged of all the vanities and fancies that attend the effort of reason to comprehend God's secret will and wisdom." Robert Hoopes, *Right Reason in the English Renaissance* (Cambridge: Harvard University Press, 1962), 162.

[95] Peter Harrison, "Francis Bacon, Natural Philosophy, and the Cultivation of the Mind," *Perspectives on Science* 20, no. 2 (2012): 141. For full investigation of this subject, see Peter Harrison, *The Fall of Man and the Foundations of Science* (Cambridge: Cambridge University Press, 2007), especially "Chapter 4: Dethroning the Idols," pp. 141 ff.

[96] Harrison "Cultivation," 147.

[97] Harrison, "Cultivation," 148. Emphasis on *Protestant* mine.

[98] Laura Georgescu, "Francis Bacon: The Theological Foundations of Natural Philosophy," *Studii de ştiinţă si cultură* VI, no. 4/23 (decembrie 2010): 75.

Alternatively, Georgescu asserts that "Bacon derives the conditions of possibility on his interpretation/reading of the myths of Creation and Fall" and that "the Baconian method is, in fact, highly dependent on his religious beliefs and on a 'religiously' constructed cosmology."[99] Thus, Georgescu's full rejection of Harrison is mysterious since the latter asserts that "[p]art of what drives this programme [viz., Bacon's Great Instauration as a whole] is a new reading of the Genesis narrative of Creation and Fall, along with a reworking of the motifs of dominion and cultivation found there."[100] To this milieu, Stephen Clucas adds succinctly that the "communication of ideas in itself is seen [within, as he argues, the context of the later Baconian Samuel Hartlib's "millenarian impulse"] as a Christian impulse."[101] I fully concur, especially as evident in the case of Hartlib's close colleague and correspondent John Dury, both of whom will assimilate Bacon's philosophy early in their respective and corresponding endeavours on behalf of the Protestant unity. However, that Bacon's legacy served to inform nominally Christian projects does not address the issue of Bacon's theology in any degree regarding its putative presence, absence, or suspension in his philosophy.

We then turn to Benjamin Milner, to whom Georgescu also refers and with whom she takes issue. Milner's analysis plumbs Bacon's *Valerius Terminus: Of the Interpretation of Nature with the Annotations of Hermes Stella* for the nature of its theological foundations, foundations which might thus be placed beneath Bacon's work at large. Milner assigns an estimated year of composition of 1603. Benjamin Farrington corroborates this year *ante hoc* in his *The Philosophy of Francis Bacon* from 1964 and, though, as Charles Webster informs us, *Valerius Terminus* would not be published until 1734, it only adds intrigue to Milner's case that the time of original composition appears to have coincided with that of Bacon's putative theological manifesto, *Confession of Faith,* another product of c.1603.[102] While Milner claims that "[the] most distinctive feature of *Valerius* . . . is its disclosure of Bacon's original interest in setting his program for the advancement of science on a theological footing," he nonetheless finds that such a purpose on Bacon's part belies the true substance of *Valerius Terminus*, which reveals a project implicitly dedicated to the *prevention* of theology and natural philosophy from interfering with one another.[103] Both *Valerius Terminus* and *The Confession of Faith* are further discussed below in this section.

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[99] Georgescu, "Theological Foundations," 75.
[100] Harrison, "Cultivation," 150.
[101] Stephen Clucas, "Samuel Hartlib's Ephemerides, 1635-59, and the Pursuit of Scientific and Philosophical Manuscripts: The Religious Ethos of an Intelligencer," *The Seventeenth Century* 6, no. 1 (Spring 1991): 34.
[102] Webster, *WGI*, 22.
[103] Benjamin Milner, "Francis Bacon: The Theological Foundations of *Valerius Terminus*," *Journal of the History of Ideas* 58, no. 2 (April 1997): 245. https://www.jstor.org/stable/3653868.

In his article, before addressing *Valerius Terminus,* Milner augments his discussion of Bacon's theo-philosophical agenda by examining the latter's even earlier work, *Meditationes Sacræ* (1597). Spedding, Ellis, and Heath include *Confession of Faith* and *Meditationes Sacræ* in an exclusive section entitled "Religious Writings" in Volume VII of *The Works of Francis Bacon* (1859). They are accompanied by three further compositions: "Prayers," "Translation of Certain Psalms into English Verse," and, tantalisingly, "Appendix to the Religious Writings – Christian Paradoxes."[104] In Milner's view, Bacon's *Meditationes* again appears to pursue a Calvinist theo-philosophical agenda wherein, as Bacon indeed thought, "atheism is unthinkable."[105] Milner finds that "the most serious arguments of the *Meditiationes*, taken together with the stress laid on the commandments for good works, indicate that Calvin's theology answers the question of the unity of Bacon's themes and strongly suggest that at this time his [Bacon's] own theological orientation lay in that direction."[106] Milner further points out that, before anything else, "Bacon's iron-willed and uncommonly learned mother, Lady Ann Bacon, was herself a Calvinist of some reputation."[107] All points would seem to indicate an irrepressible mission of Christian faith in Bacon's works at large.

As we pursue the issue further, we cannot help but note that Bacon's *Confession of Faith,* composed as it was c.1603, represents the very last of his express and titular religious writings.[108] In fact, the period between 1597 and 1603 represent a unique period in the history

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[104] Francis Bacon, *The Works of Francis Bacon, Baron of Verulam, Viscount of St, Alban, and Lord High Chancellor of England, Vol. VII* (Literary and Professional Works, Vol. II), eds. James Spedding, M.A., Robert Leslie Ellis, M.A., and Douglas Denon Heath, London: Longman, Green, and Co.; Hamilton and Co.; Whittaker and Co.; J. Bain; E, Hodgson; Washbourne and Co.; Richardson Brothers; Houlston and Co.; Bickers and Bush; Willis and Sotheran; J. Cornish; L. Booth; J.Snow; and Aylott and Son, 1859, Contents Page.

[105] Milner, *Theological Foundations*, 249. In his 1612 essay, "On Atheism," Bacon offers the interesting remark that "God never wrought Miracle, to convince *Atheisme*, because his Ordinary Works convince it." Bacon, *Ess*., 51.

[106] Milner, *Theological Foundations*, 250.

[107] Milner, *Theological Foundations*, 251. Dana Jalobeanu asserts that Bacon's is a Calvinist path. Having produced much valuable scholarship on the subject of Bacon's natural histories, Jalobeanu writes, "Following both Calvin and [Pierre] Viret, Bacon internalized idolatry as a universal disease of the mind. If in using natural history as therapy against the idolatrous mind Bacon departed from Calvin, this departure . . . gave prominence to the empirical and the 'anatomical' study of nature." Dana Jalobeanu, "Idolatry, Natural History, and Spiritual Medicine: Francis Bacon and the Neo-Stoic Protestantism of the late Sixteenth Century," *Perspectives on Science* 20, no. 2 (2012): 209-210. muse.jhu.edu/article/475252. However, my thesis argues that, relative to Bacon's methodological precepts, the comprehensive immersion in natural histories is the crucial first phase of individual natural inquiry. It is an undertaking fulfilled not so much as a means to cure a diseased mind, but as a facet of dedicated methodology necessary to do meaningful work in the acquisition of useful knowledge. As discussed above in relation to Sorana Corneanu's *Regimens of the Mind*, it is the activity of proper natural inquiry which, of its own accord, cures the diseased mind. Lorraine Daston attends the matter handily as she writes, "Part of Bacon's innovation was to invert the relationship between natural history and natural philosophy, elevating the former to the status of foundation and corrective to the latter." Lorraine Daston, "Baconian Facts, Academic Civility, and the Prehistory of Objectivity," in *Rethinking Objectivity*, edited by Allan Megill (Durham: Duke University Press, 1994), 45.

[108] "Of Atheism," a brief essay that first appeared in 1612, is discussed below. See Bacon, *Ess*, 51-54.

of Bacon's work given the religious nature of his works during that period. However, if it is difficult to qualify or quantify the degree to which Bacon's (imputed) or his mother's Calvinism influenced his philosophy, we can make more of a positive case for the influence of his political ambitions as he sought to rise in the ranks of the distinctly Protestant Elizabeth I's government beginning in the last decade of the sixteenth century. It seems far more than a coincidence that Bacon's express religious compositions, which themselves represent a very narrow creative and temporal corridor in his early life, cease in 1603, the same year of Elizabeth I's death.[109] If the whole of Bacon's life-long corpus contains a normative plethora of biblical and theological references, allusions, and imagery, there were also many non-Christian references. Bacon systematically draws on pre-Christian Greco-Roman philosophy and literature, and, as Guido Gigloni observes, "his new science [draws] inspiration from the disciplines of history, medicine and politics" on the collective whole.[110]

Milner relays an episode that occurs early in Bacon's career and which reveals the idiosyncratic nature of his [Bacon's] disposition *qua* theology and its influence on both his methodology and epistemology. Milner recounts the "scurrilous, pseudonymous attack [that] was made upon the bishops of the [Anglican] church by a certain 'Martin Marprelate'" in 1589.[111] "Bacon," Milner explains, "by now a rising star in political circles (and aiming even higher), took it upon himself to intervene."[112] The intervention would come in the form of the treatise, *An Advertisement Touching the Controversies of the Church of England*, which Bacon composed the same year, 1589. Milner relates that, in this work, Bacon "urges support and respect for the authority of the bishops, but he sympathizes, and sometimes agrees, with the complaints of the presbyters, clearly reproving the autocratic and repressive measures of the bishops."[113] While such a character of intervention on Bacon's part is indeed noteworthy,

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[109] See Eric H. Ash, *Power, Knowledge, and Expertise in Elizabethan England* (Baltimore: The Johns Hopkins University Press, 2004). Ash provides an enlightening narrative of Bacon's early professional, political, and, as Ash has it, "lean" years. He cites a letter from Bacon to Lord Burghley in 1592 in which Bacon issues a "rather pathetic appeal to Burghley for assistance. Bacon made it clear that it was no mere clerkship he sought: he aspired to serve the queen not through modest civil service but by grand intellectual service" (p. 194). In his substantial analysis of Bacon's formative years, Ash's narrative is remarkable, one, for its complete lack of religious reference or language, and two, for Ash's non-concern in engagement with such an issue. Ash credits Bacon's "*humanist* educators," (emphasis mine) who, "[w]ith regard to private life, . . . taught their students that being virtuous and living a virtuous life were very much the same thing – morality had to be applied, or it did not exist" (Ash, *Power . . . Expertise*, p. 193).

[110] Guido Giglioni, "Chapter 1 Introduction: Francis Bacon and the Theologico-political Reconfiguration of Desire in the Early Modern Period," in *Francis Bacon on Motion and Power*. International Archives of the History of Ideas Archives Internationales D'histoire Des Idées Editors Guido Giglioni, James A.T. Lancaster, Sorana Corneanu, Dana Jalobeanu, (Ser. Cham: Springer, 2016), 3. https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1175270&site=ehost-live

[111] Milner, "Theological Foundations," 251.

[112] Milner, "Theological Foundations," 251. *Advertisement* would only be published in 1640, though, as Milner relates, it was "circulated privately" in 1589. (Milner, 251-252).

[113] Milner, "Theological Foundations," 251.

what follows in Milner's analysis aligns closely with the discourse of Bacon's nuanced inclusion of theology in his philosophy. Milner observes, "His stance is that of a mediator who recognizes the rightful claims as well as the error and mischief on both sides. His overriding concern is the peace of the church and he seeks with some passion to persuade the contending parties that it should be their concern as well."[114] The point we take from Milner's description of the Marprelate episode of 1589 is that Bacon, before anything, considers himself a *politician*, that is, a functionary amongst and of the world of human beings. For him, the church is a *political* institution, that is, an institution made by and for the use of *men*, and must succeed as such if its divine substance is to be properly tendered.[115]

Milner delivers the coup de grâce of his analysis in its closure. In *Valerius Terminus*, Milner writes, Bacon confirms a "dichotomy . . . between faith and knowledge. Faith is something revealed to us by God and is 'more worthy' than knowledge, but it will never count for knowledge in the sense required by Bacon's science."[116] Milner thus finds the arguments that claim Bacon's philosophical and epistemological writings are intended as actively Christian – much less, distinctly Calvinist – projects to be unconvincing. Rather, Bacon deliberately and concertedly separates the respective epistemologies and methodologies of theology and science.

In response to Harrison's analysis of the Augustinian refraction of Cicero's *cultura animi*, I suggest that Bacon would have taken extra care to invoke Cicero alone. Harrison writes,

> Cicero had likened the uneducated individual (*animus sine doctrina*) to uncultivated land, before going on to identify philosophy as the means through which the mind should be cultivated. For Augustine, however, it was not the spiritual exercises of pagan philosophy that wrought the culture of the mind: rather it is God who cultivates us as the farmer cultivates his field, rooting out bad weeds with his word, opening up hearts with the plough of his doctrine, planting the seeds of devotion, and waiting for the fruits to appear.[117]

What Harrison (or, rather, Augustine) has done here is assign to God the very role Bacon assigns to humanity, that of the cultivator. In Bacon's view, to assign God this role is tantamount to assigning Him the status of fellow participant in the realm of second causes, that is, to have Him beholden to the same natural laws of Man. Bacon deems God both creator and cultivator of *first* causes and *Man* to be the cultivator of second causes. This arrangement

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[114] Milner, "Theological Foundations," 251-252.
[115] Given this context, it is indeed worthwhile to re-read "Of Atheism" (Bacon, *Ess*, 51-54).
[116] Milner, "Theological Foundations," 261.
[117] Harrison, "Cultivation," 139.

should not be misunderstood. In fact, for Bacon, God, Nature, and Man remain three distinct, self-contained discourses of philosophy and knowledge.[118]

Appended to his duty to cultivate the natural world (on its own terms) into a source of human utility and beneficence, Man is charged with cultivating his own intellect on the terms of his moral virtues, the two of which are inextricably related. The place of virtues in Man corresponds to the place of nature in the divine realm; Man's virtues and God's nature are analogous second causes. In the same way that nature is the living evidence of divine goodness, so the virtues are the living evidence of Man's goodness, and, as such, the evidence of a proper husbandry of the reason of his will.

Harrison notes that "Augustine also complicated the Stoic picture by placing the will, rather than reason, at the centre of his account, and by allowing a legitimate place for the passions in the well-ordered life."[119] However, where Augustine would seem to separate the will and reason (or the Stoic "right reason"), Bacon joins them, making reason the very substance – and sole substance – of the will. It is the responsibility of the human individual to cultivate his passions and his virtues so that he might direct his inherent power of reason to useful, beneficent ends, to charity and posterity. That beneficence, as Bacon admonishes, can only be achieved by the refraction of the reason given by God to the will through the goodness voluntarily cultivated by the individual human animal.

Harrison reads from Augustine that "virtue is cultivated in the soul by God rather than by human effort."[120] The former then duly assigns to Aristotle the contention that "virtues are infused, rather than acquired."[121] This is problematic. As we will see again in this thesis, Aristotle allows only that the *potential* for virtue is infused in Man.[122] Bacon agrees and will allow only that the *potential* for goodness and virtue is given in the soul in the foundational form of unclaimed reason. Man must prove himself capable of using that reason for virtuous ends; God gives nothing to that endeavour. Thus, Bacon reaches back over Augustine to

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[118] In "The Third Book" of *De augmentis*, Bacon explains that "[*t*]*he Object of Philosophy is of three sorts* ; God; Nature; Man: so likewise there is a Triple *Beam* of Things; *for Nature darts upon the understanding with a direct Beame*; *God because of the inequality of the mediu[m], which is the Creature, with a refract beame* [in Spedding's translation of this clause, God enters Man's understanding "by reason of the unequal medium (viz., his creatures), with a ray refracted." (Spedding 4, 337)]; *and man represented and exhibited to himself, with a beam reflext.* Wherefore Philosophy may fitly be divided into three knowledges; the *knowledge of God*; the *knowledge of Nature*; and the *knowledge of Man.* (Bacon, *OAPL*, 132).

[119] Harrison, "Cultivation," 140

[120] Harrison, "Cultivation," 141.

[121] Harrison, "Cultivation," 141.

[122] See Aristotle, *Ethica Nicomachea*, in Aristotle, *Ethica Nicomachea; Magna Moralia; Ethica Eudemia de Virtutibus et Vitiis*. Vol. 9 of *The Works of Aristotle*, trans. W.D. Ross (Oxford: Oxford University Press, 1915), Book II (I), 1103a line 15 ff.

Aristotle, who, in fact, stipulates that virtues are cultivated by human habit and not given as original divine material.[123] And so we begin our discussion of Bacon's theology.

2.2.2 The Place of Theology in Bacon's Great Instauration

In his philosophy for the advancement of learning and its adjunct project of natural inquiry, Bacon separates the human from the divine as a matter of epistemological and methodological necessity. Goodness is, in the earthly world, the fundamental appetitive quality present in Man's philosophy, his human nature, and in nature at large. Goodness, as Bacon sees it, provides the necessary material context in which human works will be meaningful, useful, and, above all, manifest in posterity as charity. However, where the right reason (to be discussed in the following section) in nature *inherently* manifests as goodness, that is, as the appetitive deference to posterity, the human individual must deliberately cultivate their analogous goodness so that they can influence the right reason of their will. They must dedicate themselves to the virtuous life in order for their reason to succeed as the foundation of their goodness and so as the foundation of useful and practical works.

This schematic descends from the original Stoic philosophy, the ends of which Frederick Clifton Grant has explained in his article, "St. Paul and Stoicism," published in 1915. Grant's introductory nutshell on St. Paul in fact serves well to illuminate Bacon's intentions: "In the practice of duty, virtue as virtue, the Stoic found the freedom and independence he craved, and his ethical highest good. What his ideal demanded on the speculative side rarely worried him. Speculation had been the foundation of the earlier schools of philosophy: and it had no *practical* results."[124]

This general explanation derives from Grant's more thoroughgoing discussion regarding the putative influence of Stoicism on St. Paul, from whom Bacon takes his (Bacon's) notion of *charity* as the ultimate virtue of goodness.[125] Grant reminds us that

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[123] Aristotle writes: "Again, of all the things that come to us by nature we first acquire the potentiality and later exhibit the activity (this is plain in the case of the senses; for it was not by often seeing or often hearing that we got these senses, but on the contrary we had them before we used them, and did not come to have them by using them); but the virtues we get by first exercising them, as also happens in the case of the arts as well. For the things we have to learn before we can do them, we learn by doing them, e.g. men become builders by building and lyre-players by playing the lyre; so too we become just by doing just acts, temperate by doing temperate acts, brave by doing brave acts." Aristotle, *Ethica Nicomachea*, Book II, Section 1, line 25 (1103a) – line 5 (1103b).

[124] Frederick Clifton Grant, "St. Paul and Stoicism," *The Biblical World* 45, no. 5 (May 7, 1915): 270. https://www.jstor.org/stable/3142715.

[125] See Corinthians 3:14: "And above all these things *put on* charity, which is the bond of perfectness." King James Bible Online: https://www.kingjamesbibleonline.org/Colossians-Chapter-3/. In the Seventh Book of *De augmentis*, Bacon writes, "true Religion, and the Holy Christian Faith, laies hold on the substance it selfe, imprinting upon mens Minds *Charity*, which is properly called, *The bond of perfection*." (Bacon, *OAPL*, 361).

Christian tradition and scripture is replete with philosophical concepts and precepts that long predate it. He concludes that

> [b]arring a *direct* and *conscious* influence of Stoicism upon Paul, we need not be hindered in looking for remoter points of contact. Paul certainly was not a Stoic. Most of his principles were diametrically opposed and utterly alien to Stoicism. But the *effects* of Stoicism were in the air. The general culture and thought of the times, to which Stoicism as well as other movements contributed, may have influenced him.[126]

Grant's point conveys that it does not matter that the Apostle Paul, who was born in Tarsus, the birthplace of Stoic luminaries Zeno and Antipater, was not a Stoic, or whether charity, as a Pauline invocation, has Stoic roots. In fact, Grant unwittingly makes our case for Bacon's scriptural but potentially "unsubscribed" invocation of the Pauline charity by way of Paul's mere proximity, or lack thereof, to Stoicism. Again, we may continue to assume (in the spirit of Grant's argument) that Paul was not himself a Stoic. As he defends that very assessment, Grant argues that

> there had been two centuries for the language to permeate to some degree the entire atmosphere of Cilician Tarsus. Everyone there, certainly, if not in the whole Roman Empire, might be unconsciously using Stoic terms . . . Granting that Paul used these particular terms with the specialized meanings given them by the Stoa, does it then follow that the Stoa affected the essence of his Gospel, or even the essential form of his expression of it?[127]

The implied answer is, "no." However, like Paul, Bacon (his political agenda aside) uses the available language and conceptual touchstones of his own age. His invocation of Pauline charity, and even the scriptural encomium in which he couches it, is no more binding that Paul's invocation (according to Grant) of such Stoic (and, as we have noted, Heraclitean) terms as "Logos," which Paul "adopted . . . to express what he conceived to be the relation of Christ to the entire universe."[128]

Bacon's invocation of "charity" from Corinthians 3:14 indeed proves an apt point of entry into the debate about the degree to which Bacon has or has not submitted his work as a vehicle of Christian theology. Scholars have made assertions along a spectrum which spans from, on one end, having Bacon as (like his mother) a holder of a devout Protestant faith which informs every measure of his project, to an opposite pole which contends that Bacon

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[126] Grant, "St. Paul and Stoicism," 276.
[127] Grant, "St. Paul and Stoicism," 279.
[128] Grant, "St. Paul and Stoicism," 279. Of course, the term and semantic of the Greek (viz., Heraclitean) "logos" predates Christ by nearly half a millennium, and so Paul by even more.

felt no obligation to Christianity or, furthermore, was an atheist. Timothy Paterson intensifies the argument, suggesting that Bacon was "indifferent and even hostile to Christianity."[129]

While I would not claim that Bacon was an atheist, nonetheless my thesis advises restraint in the attribution to Bacon of any concerted intent to qualify his endeavours towards the human advancement of learning and natural inquiry according to either an ecclesiastical Christian agenda or one hostile to Christianity. My analysis finds instead that Bacon sees as necessary the removal not of the possibility of divine presence in the works of men, but rather of Man's presumptions of divine presence and influence. I do not find the evidence in Bacon's works to support the claims of such scholars as Laura Georgescu and Peter Harrison who, as we have seen above, assert that Bacon submits his philosophy and epistemology on behalf of a Christian theological project. However, neither do I suggest that Bacon wrote on behalf of what he saw as a world without God.

The great Bacon historian Charles Webster himself has argued famously and inclusively on behalf of the Christian mission of seventeenth-century natural inquiry at large, devoting particular attention to the influence of the Book of Daniel, in particular Daniel 12:4, on Bacon's and others' work.[130] Stephen Clucas's authoritative scholarship on Samuel Hartlib reinforces the inclusive scope of the Christian motivations of Bacon, Hartlib, Dury, Comenius, and, not least, Robert Boyle.[131] Stephen McKnight argues that Bacon's Great Instauration is a reformist endeavour "drawn from Judeo-Christian scriptures."[132] In company with Charles Webster, McKnight is neither the first nor the last to present Bacon's invocation of Daniel 12:4 as evidence of the latter's theological mission.[133] I would acknowledge that, indeed, these scriptural writings carried a weight of influence on seventeenth-century natural inquiry.

However, I would add that Bacon's works draw on and include myths not just of Christian origins, but of Greco-Roman and Hebraic origins as well. Such invocations are Bacon's tools of analysis. In fact, in the course of Bacon's works, we are not given a great

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[129] Timothy Paterson, "On the Role of Christianity in the Political Philosophy of Francis Bacon," *Polity* 19, no. 3 (Spring 1987): 419. https://www.jstor.org/stable/3234797.

[130] See Webster, *WGI*, 9 ff. and passim. Daniel 12:4 reads, "But thou, O Daniel, shut up the words, and seal the book, *even* to the time of the end: many shall run to and fro, and knowledge shall be increased." (King James Bible Online: https://www.kingjamesbibleonline.org/Daniel-Chapter-12/#4). Bacon and other progenitors of the natural philosophy that had come to the fore as the sixteenth century closed and the seventeenth opened took this as the divine sanction of the sensory-intellectual interpretation of nature. From this new year-zero of sorts, the old learning from speculative logic would be supplanted by epistemologies based on observation and verification.

[131] See Stephen Clucas, "Samuel Hartlib's *Ephemerides*," *The Seventeenth Century* 6, no. 1 (Spring 1991): 33-55.

[132] Stephen A. McKnight, *The Religious Foundations of Francis Bacon's Thought* (Columbia: University of Missouri Press, 2006), 3.

[133] McKnight, *Religious Foundations*, see pp. 49-50 and *passim*.

deal of information regarding his religious conviction even despite writings such as Bacon's *Confession of Faith* c. 1602/3 (the possible motivations for which we have discussed above). By the same token, we would likewise be taking a liberty in attributing to Bacon any leanings toward atheism, such as Jerry Weinberger's assertion that "Bacon was a non-believer, even if he pretended to be otherwise . . . [and that he] was a non-believer on rational grounds."[134] Rather, closer to the thesis discourse (and approaching Harold White's discourse below on Bacon's political faith), we revisit Paterson's article, "On the Role of Christianity in the Political Philosophy of Francis Bacon." Paterson explains,

> My intent is to question the prevailing view which emphasizes so strongly the religious factor in Bacon's thought. Belief in the essentially Christian inspiration and intention of Baconian science, is in my opinion, the single greatest contemporary obstacle to understanding Bacon's real thought about the moral and political control of scientific power, and hence to understanding his political philosophy as a whole.[135]

Here again, we note that Bacon routinely quotes Christian scriptural texts as he does manifold texts from a spectrum of non-Christian philosophical sources ancient and otherwise. However, analysis concludes he does so in order to facilitate the full success of reception regarding his own philosophical and didactic precepts. We have seen above the degree to which, even in official ecclesiastical matters, Bacon defaults to the role of *politician* in the true sense of the term: one who attends the *polity*. His instillation of scripture into what might otherwise be deemed vulgar contexts indicates his esteem for the helps of all philosophies in the definitively *human* endeavour of learning. He treats Christian scripture and other ancient non-Christian texts as being equally useful in the important art of transmission, or what he designates "*Traditionem Lampadis, the Delivery of the Lampe, or the Method bequeathed to the Sonnes of Science.*"[136] The semantic and symbolic fields of all myths are equally pliable and useful in the task of communicating philosophy. In *The Advancement of Learning*, Bacon explains,

> [but] to me . . . that do desire as much as lyeth in my Penne, to ground a sociable entercourse betweene Antiquitie and Proficience, it seemeth best, to keepe way with Antiquitie *vsque ad aras*; And therefore to retaine the ancient tearmes, though I sometimes alter the vses and definitions, according to Moderate proceeding in Ciuill government, where although there bee some alteration, yet that holdeth which *Tacitus* wisely noteth, *Eadem Magistratum vocabula*.[137]

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[134] Jerry Weinberger, "Francis Bacon and the Unity of Knowledge: Reason and Revelation," in *Francis Bacon and the Refiguring of Early Modern Thought*: *Essays to Commemorate* The Advancement of Learning, ed. Julie Robin Solomon and Catherine Gimelli Martin (Aldershot: Ashgate Publishing Limited, 2005), 111.
[135] Paterson, "On the Role of Christianity," 421.
[136] Bacon, *OAPL*, 273; In his translation of this passage, James Spedding supplants "the Sonnes of Science" with "Posterity." Bacon, Francis. *Translations of the Philosophical Works, 1*. Vol. 4 of *The Works of Francis Bacon*, edited by James Spedding, Robert Leslie Ellis and Douglas Denon Heath. 1858. (Cambridge: Cambridge University Press, 2011), 450.
[137] Bacon, *AL*, 81.

Again, we note Bacon the self-described politician who alters usage and definition of terms according to moderate proceeding in civil government (this prepares us for Howard White's analysis of Bacon's "political faith"). Thus, we may apply such terms as *charity*, which Bacon appropriates, to this rubric, as we might any of the many other literary symbols such as *labyrinth* or *morality*.

Bacon further expressly contends that, in his work, the divine and the profane are not opposed. In essence, Bacon considers the profane also to be the work of God and that, as such, it should require no apology when it is included in works of natural and philosophical explorations. In *The Advancement of Learning* (1605), Bacon writes,

> it hath beene extreamely set on foote of late time by the Schoole of *Paracelsus*, and some others, that haue pretended to finde the truth of all naturall Philosophy in the Scriptures; scandalizing and traducing all other Philosophie: as Heathenish and Prophane: But there is noe such enmitie betweene Gods word, and his workes. Neither doe they giue honour to the Scriptures, as they suppose, but much imbase them. For to seeke heauen and earth in the word of God, Whereof it is saide, *Heauen and Earth shall passe, but my worde shall not passe*, is to seeke temporary things amongst eternall; And as to seeke Diuinitie in Philosophy, is to seeke the liuing amongst the dead; So to seeke Philosophy in Diunitie in to seek the dead amongst the liuing.[138]

We might see Bacon's separation of philosophy and divinity as a service in fact done on behalf of divinity.

Bacon routinely cites the works of Greek and Roman pre-Christian philosophers. In *De sapientia veterum* (1609), he submits a physical analysis of the world and the cosmos based wholly on pre-Christian Greco-Roman figures of religious mythology. This, of course, does not reveal him to harbour pious devotion to the pre-Christian gods. Sophie Weeks explains Bacon's use of Stoic, biblical, and other allusions as his chosen means to transmit his prescriptions. Weeks affirms that,

> [i]n essence, what Bacon has done [in the collective entirety of his literary compositions] is to interweave Stoic elements into his vitalistic atomism, allowing him to combine a bottom-up and top-down approach. This appropriation of Stoic material is unsurprising given the Stoic milieu in which he moves. In addition to Cicero's, Seneca's, Marcus Aurelius's and Diogenes Laertius's accounts of Stoic philosophy, Stoic thought percolated through the Italian naturalists. Fracastoro, for example, was keen on the contemporary revival of Galen's writings, though he was not always positively responsive to them […]. Even disregarding Bacon's thorough-going materialism and the deployment of typical Stoic-derived phrases that had become cultural commonplaces (such as "dictates of reason" and "right reason"), there is no

[138] Bacon, *AL*, 188.

> mistaking the fact that many of his key concepts and terms are of Stoic provenance and very little doubt that he was perfectly cognizant of this […].[139]

Whatever his own theo-philosophical proclivities, Bacon's chief concern, as Weeks observes, in the construction of his philosophy and epistemology is to provide his readers with the tools to recognise a natural world that is indeed divinely made (whether by the hand of God or from the primary material of right reason) but also one in which they, as human beings, are products of second causes. In the world of second causes, the highest hope and salvation for Man is, indeed, charity, but it is a human, not a divine, quality nor a divine quantity. As such, it is built on the twin pillars of beneficence and posterity. Thus, Bacon separates the human task of achieving charity as the 'bond of perfection' from the human task of directly deferring to the will of God.

Bacon's charity represents that which yields the greatest benefit to Mankind from within the context of the *utility*, or the *usefulness* of knowledge, not salvation or divine instruction. Here, our analysis benefits from the well-known work of Howard White. His rightly venerated *Peace Among the Willows* contains the intriguing claim (and antique reference) that "[it] was . . . Francis Bacon [not Prometheus] who led us into the labyrinth, who stole fire from the gods."[140] White explores the discrepant qualities between Bacon's religious and *political* faith. He explains,

> we are here concerned both with possibility and with beneficence. But these things cannot be disjoined. Certainly Bacon did not disjoin them. He knew that in urging faith in science, he was taking a risk that science might bring death along with life, destruction along with healing. He tried to construct defenses against the misuse of scientific power. That means that his faith was not naive or unconscious, and that, if it owed anything to Christian faith, he knew what it was. He was using old words to bring, slowly and furtively, to those words, new meanings […]. What political faith did claim, and does claim is something of the ardor, something of the exclusiveness of Christian faith. It too may well be, to its adherents, 'the only thing wherein the heart of man can recline' [from Calvin, *Institutes of the Christian Religion*]. And it too may demand the same passionate seriousness, the tension with doubt, if not with search, that Christian faith demands, That, however, is not an unconscious derivative from theology. In the terms it employs, it may well be a deliberate distortion of theology. But in its deeper meaning and its goals, it is neither. It rests on a *radical revision of political philosophy*, the relation between political philosophy and society.[141]

Though they may be epistemologically distinct, neither religious nor political faith precludes or excludes the other. If anything, the former, in the postlapsarian world of second causes,

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[139] Sophie Weeks, "A New Nature: Francis Bacon and the Project of Human Mastery," unpublished manuscript, Chapter 2. Used by permission of the author.
[140] Howard White, *Peace Among the Willows: The Political Philosophy of Francis Bacon* (The Hague: Matinus Nijhoff, 1968), 13.
[141] White, *Peace Among the Willows*, 3. Emphasis mine.

might prove to inform the latter. White indeed places Bacon's work in the category of political faith, a placement which by no means dismisses Bacon's *Christian* faith. White affirms that, indeed, "charity [is] also traditionally a theological virtue," but that "Bacon treats the theological virtues as the political fustian of philosophy."[142] White concludes:

> Baconian knowledge is held to be humbler, as it is directed to 'charity and not to swelling; to use and not to ostentation' . . . Whether, in fact, a teaching that holds knowledge to be for endless progression of utility, enriching society through a more abundant life, is humbler than teaching which, because of its knowledge of good and evil, holds that the practical applications of knowledge are not unlimited, can be questioned. One thing is clear. Bacon's 'charity' is a long way from . . . agape.
>
> Baconian charity directs knowledge *ad meritum et usum vitae*. Since Bacon insists that Christianity established the superiority of the active over the contemplative life, 'charity', *the virtue of the active life* [emphasis mine], must be superior to perfection, the virtue of contemplation. Charity then is a kind of 'public duty.' But whatever in the Christian meaning of *agape* is related to self-renunciation, prayer, and the love of man through the love of God is quite foreign to Baconian charity.[143]

White continues,

> Just as good works, or poverty, defended, to some extent, the learning of the Church, and the activities of people outside the workaday world, Bacon hoped, by using a Christian term [viz., charity], to defend the scientific fraternity of the future, before its ultimate defense in massive inventions could take place . . . Baconian charity is intended to be the sound and sufficient answer to any Christian praise of ignorance. Knowledge spiced with charity is antithetical to knowledge intended for 'swelling' or ostentation. It is impossible for the charitable man to be too well studied, not only in the *book of God's word, but also in the book of God's works* . . . Knowledge of natural history, the foundation of the new philosophy, may by-pass the Fall.[144]

We see in White's analysis that Bacon's use of the term *charity* and his invocations of Christian scripture form a utilitarian epistemological pastiche rather than *in*form a Christian programme.

Thus is the case with Bacon's invocation of Greco-Roman myth. As a means to illustrate his discourse on political faith, White turns to Bacon's treatment of the fable "Styx: or Treaties," an allegory included by the latter in *De Sapientia Veterum*.[145] In that work, Bacon writes,

> It is a very common tradition that of the one oath by which the gods bound themselves when they meant to leave no room for repentance; and finds a place in a great many fables. In that case they invoked as witness, not any majesty of heaven or any divine attribute, but Styx; a river in the infernal regions which with many windings encircled the palace of Dis.[146]

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[142] White, *Peace Among the Willows*, 21.
[143] White, *Peace Among the Willows*, 21. For "charity" and "swelling" allusions, see Bacon, *AL*, 7.
[144] White, *Peace Among the Willows*, 22. Emphasis mine.
[145] See White, *Peace Among the Willows*, 85; also, Bacon, *DSV*, 706.
[146] Bacon, *DSV*, 706.

We see here that even the gods assigned formal power to things not only *not* of heaven, but of the infernal regions, arguably more profane than any feature contained in the earthly world of second causes. White's analysis affirms that

> Bacon applies this fable to treaties, which are held only by necessity, and not by pledges. The idea that necessity is the highest and most effective political pledge, particularly in matters of foreign policy, where the law is at its most ineffective, is neither startling or shocking. But Bacon goes farther than that. In effect he denies the dependence on an oath, or on a religious tradition, altogether.[147]

However, this lack of dependence on behalf of epistemology cannot prove any derogation from Bacon's religious belief, whatever the degree of his piety. White only illuminates the necessarily political motions of Baconian utility and Baconian charity, again, on behalf of transmission.

We thus note Bacon's language in the aforementioned treatise, *The Confession of Faith* (1602/3), which, again, he composed two years prior to *The Advancement of Learning*. In this putatively pious tract, he discusses the postlapsarian state of Man and, as such, the distance between Man and God in a world which is now once removed from its divine creation. The primary vein of discourse as it applies to Bacon's epistemology (as discussed above) is that human beings, as fallen creatures, have been forever penalised with the onus of having to choose between Good and Evil by the power of their own mind. Man must consciously devote his life to cultivating his goodness once he has chosen that preferable – and far more difficult – path. In *The Confession*, Bacon writes,

> That he [God] made all things in their first estate good, and removed from himself leaving the beginning of all evil and vanity into the liberty of the creature; but reserved in himself the beginning of all restitution to the liberty of his Grace; using nevertheless, and turning the falling and defection of the creature (which to his prescience was eternally known) to make way to his eternal counsel touching a Mediator, and the work he proposed to accomplish in him.[148]

We may take from Bacon's text that Man is no longer the participant in or recipient of direct divine substance as was Adam; the beginning of all evil and vanity (and, by extension, all goodness and virtue) is now left to the liberty of the individual human creature. The human beings is now itself the product of second causes and, as such, maintains a relationship to God is as a constituent seeking counsel and grace by means of a Mediator (i.e., the world of God's creation, Nature, of which Man is now, himself, a part). This perhaps more radical

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[147] White, *Peace Among the Willows*, 85.

[148] Francis Bacon, "The Confession of Faith," *The Works of Francis Bacon Baron of Verulam, Viscount St. Alban, and Lord High Chancellor of England, Vol. VII*, collected and edited by James Spedding, Robert Leslie Ellis, and Douglas Denon Heath, (London: Longman, Grenn, and Co., 1859), 220.

interpretation differs from that of Steven Matthews, who places Christ in the role of Bacon's Mediator. However, even in Matthews' analysis, Bacon has nonetheless placed the figure of Christ amongst men as a fellow of second causes; humanity continues to be once removed from the divine realm. In this strange case, Christ and Nature would seem to stand on equal theological footing. Indeed, as Matthews points out, for Bacon to have "[presented] a doctrine of Christ as 'Mediator' . . . would have drawn heavy fire from most contemporary Protestants."[149] God is no longer the granter or guarantor of Man's goodness, or, rather, *the goodness of Man's reason* as had been the case before the Fall. Bacon, even at this early stage, invokes and identifies the postlapsarian responsibility of humankind to husband its own power of appetitive goodness. No longer is that power given directly by God; it exists in its own potential – primary – state which is contained in Man himself.

Regarding Bacon's motivation for composing *The Confession of Faith*, we might consult the strikingly pertinent possibility submitted by Paterson which suggests political prudence on Bacon's part. Paterson, who himself calls any theological intent on Bacon's part into question, observes,

> the open expression of unorthodox views on religion would have exposed him to serious danger; as Spedding points out, Bacon's England was 'a world in which the publication of a false opinion was to be an offence and forbidden under penalties.' For an ambitious but impecunious man and passionate reformer, who wished to be heard on many subjects in addition to religion, the limits of what could be said were even narrower than the legal ones.[150]

Such concerns would have certainly applied to Bacon, in 1602 a young and ambitious aspirant to both political and literary/philosophical careers amongst the administrative and social milieu of the extremely pious Elizabeth I. Bacon, indeed, more than only "wished to be heard." Howard Hotson maintains that, further, "[f]or Bacon, a more acute problem was the incompatibility of his project with the pessimistic eschatology of traditional, magisterial Protestantism."[151] Whether or not Bacon's project was indeed incompatible with magisterial Protestantism (this assertion would certainly involve complications regarding the Merton thesis), there is no evidence in any of Bacon's work of any struggles with incompatibilities in his own work whatsoever.

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[149] Steven Matthews, *Theology and Science in the Thought of Francis Bacon* (Aldershot: Ashgate Publishing Limited, 2008), 41.
[150] Paterson, "On the Role of Christianity," 421-422. See Francis Bacon, *The Letters and Life of Francis Bacon Including All His Occasional Works Namely Letters Speeches Tracts State Papers Memorials Devices and All Authentic Writings Not Already Printed Among His Philosophical Literary or Professional Works Newly Collected and Set Forth in Chronological Order with a Commentary Biographical and Historical by James Spedding, Vol. IV*, ed. James Spedding (London: Longmans, Green, Reader, and Dyer, 1868), 345.
[151] Howard Hotson, *The Reformation of Common Learning: Post-Ramist Method and the Reception of the New Philosophy, 1618-c.1670* (Oxford: Oxford University Press, 2020), 192.

Steven Matthews puts it plainly as part of his discussion of Bacon's increasing philosophical distance from John Calvin and closer proximity to Peter Harrison's analysis of Augustine: "Bacon's Instauration, which was very much on his mind while he was writing the *Meditationes Sacræ* [c.1602, at almost the same time as the *Confession of Faith*], was to be a human project, requiring the power or industry of man, and genuine human agency. As Karl Wallace has observed, the distinctive feature of Bacon's understanding of the human will was the 'power of choice'."[152]

Perez Zagorin not only confirms this reasonable assessment in specific regard to Bacon, but to the milieu of early modern natural inquirers in general. Cutting the line directly between claims of Bacon's Christian or secular intentions and the respective shades of overt or covert approaches that scholars have imputed toward those intentions, Zagorin writes,

> There are certain Baconian scholars who claim that Bacon was secretly religious but dissembled in his unbelief. His writings, however, contain no clue or statements to substantiate this view. The distinction he assumed between faith and reason was a very old one, common to many Christian philosophers. Certainly it need not have implied any doubt of the supernatural truths of the Christian religion as known through revelation . . . Bacon's attitude was typical of the English thinkers of his time who took an interest in science. All of them held that religion and science should be kept separate and also that the two were complementary to one another.[153]

However, perhaps no one could have stated the matter as plainly as Bacon himself in his decidedly open expression contained in the *Cogitata et Visa* which he composed in 1607. This is well within a five-year span following *Confession of Faith* and *Valerius Terminus*. At no point in the interim between these works has Bacon submitted amendment, retraction, or revision of these two earlier works. In fact, we may surmise that Bacon, in keeping with the consistency which defines the entirety of his life's work, only intended that the *Cogitata* correspond to and confirm that which had come earlier.

We do well here to remind ourselves of Bacon's unstintingly dim view of the scholastic tendency to inject philosophical disputation into the body of religion. We are thus left to question the putative Baconian allegiance to the Neo-stoicism of Augustine and Aquinas, which might qualify in Bacon's view as evidence of Man's idolic errors.[154] Again, I assert that Bacon is neither religious zealot nor atheist, that he only recognises that all things

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[152] Matthews, *Theology and Science*, 39; also, see Karl Wallace, *Francis Bacon on the Nature of Man* (Urbana: University of Southern Illinois Press, 1967), especially 140-141. Wallace writes (regarding Bacon), "For purity of illumination and freedom of will began and fell together; and nowhere in the universal nature of things is there so intimate a sympathy as between truth and goodness" (Wallace, 141).

[153] Perez Zagorin, *Francis Bacon* (Princeton: Princeton University Press, 1998), 49.

[154] However, as Peter Anstey and Albert Vanzo have pointed out, Aquinas especially is a crucial link in the historical development of "the speculative/practical distinction of *disciplinary domains*." See Peter Anstey and Albert Vanzo, "The Origins of Early Modern Experimental Philosophy," *Intellectual History Review* 22, no. 4 (December 2012): 503 ff. https://doi.org/10.1080/17496977.2012.725552.

on Earth and in Heaven have a proper epistemological and methodological place. However, as we see, this middle position between theology and science in no way attenuates his passion regarding the matter of separation. If Paterson is correct in his claim that authors in the England of Bacon's time were wise to take measures against distributing "the open expression of unorthodox views on religion," then we may understand Bacon's earlier submissions which would seem (but, again, illusorily) to convey his solid and unbreachable Christian faith.

What follows from the *Cogitata* is extraordinary. Bacon's original Latin is translated by Benjamin Farrington:

> In our own days discussions concerning nature have been subjected to even harsher constraint by reason of the boldness of the Scholastics and their followers. They have not only done their best to reduce Theology into the form of a manual but have had the temerity to incorporate the disputations and contentious philosophy of Aristotle into the body of religion.
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> Another example of the same kind of dangerous tendency is that no opinions are in such favour today as those which with solemn pomp seek to celebrate a legal marriage between Theology and Natural Philosophy, that is between Faith and the evidence of the sense, and which charm the minds of men with a pleasing variety of matter while producing a disastrous confusion between the human and the divine. The careful inquirer will find that there is more danger to Natural Philosophy from this specious and ill-matched union than from open hostility. For in this intimate contract only what is already received in Natural Philosophy is included; all fresh growth, additions, improvements are excluded more strictly and obstinately than ever before. In fine every development of philosophy, every new frontier and direction, is regarded by religion with unworthy suspicion and violent contempt.
>
> Others of a simpler turn of mind fear lest any thorough enquiry into nature may transgress permitted bounds. They make the mistake of transferring what is said about divine mysteries (many of which remain under divine seal) to the hidden things of nature, which are under no interdict. There are those too whose cunning leads them to suppose that, if secondary causes are unknown, everything will be directly referred to the hand and magic wand of God. This they suppose to be of great importance for religion, but in fact they merely seek to please God by a lie. Others, not without warrant in precedent, fear that any change and stir in Natural Philosophy is bound to end in a clash with religion which will bring it to a halt. Some finally even fear that in the enquiry into nature something may come to light which overthrows religion. Both these fears smack of incredulity and unspiritual wisdom. The latter, indeed, cannot be entertained without impiety.
>
> The conclusion of this meditation is that in opinions of this sort there is much evidence of weakness, malice and instability. Next to the word of God Natural Philosophy is the most certain cure for superstition and the most approved nutriment of faith. Its rightful station is as the accepted and loyal handmaid of religion, for religion reveals the will of God, Natural Philosophy His power.[155]

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[155] Francis Bacon, "Thoughts and Conclusions," in Benjamin Farrington, *The Philosophy of Francis Bacon*; *An Essay on its development from 1603 to 1609 with New Translations of Fundamental Texts*, trans. Benjamin Farrington, (Liverpool: Liverpool University Press, 1964), 77-79. For the original Latin passage, see *COGITATE ET VISA: Interpretatione NATURÆ, SIVE DE SCIENTIA OPERATIVA,* in Spedding *Works, Volume 3*, 595-597. Importantly, in the "Preface" to the Latin *Cogitata et visa* in the latter source, Spedding informs us that this potentially controversial work of Bacon's would not appear in print until 1653, where, as Spedding is correct to note, it "stands first in Gruter's volume [viz., *Scripta naturali et universali philosophia*]." (Spedding Volume 3,

Here, we recall Bacon's text quoted above in this section from *The Advancement of Learning* which contains his suggestion that the best tribute to the divine hand of God lies in the theologically unencumbered pursuit of profane science. Bacon's attitude toward his philosophy and epistemology at large might best be described by an invocation redolent of Aristotle: there is a place for everything and everything has its place. This holds true of matter in the universe and in the matter of mind, of matter divine and profane. And so we turn now to the matter of the will.

2.2.3 Bacon's Invocation and Application of Right Reason

From the discussion of Bacon's theology, we come to Bacon's invocation of "right reason" as it appears in the opening text of the Seventh Book of *De dignitate et augmentis scientiarum* (1623). The text reads as follows:

> *Right Reason governs the will, Good Apparent seduceth it; the Incentives of the will are the Affections, the Organs and voluntary Motions, are hir Ministers; of this faculty Salomon saith, Above all keeping, keep thy Heart, for out of it issue the actions of life*. In handling of this Science [viz., Moral knowledge], those which have written thereof […] have […] propounded unto us good and faire examples and draughts, or accurate portraitures of *Good, Virtue, Duties, Felicity*, as the true objects and scopes of *mans Will* and *Desires*: but how to take a just level at these marks […] either they passe it over altogither, or performe it slightly and unprofitably. It is not the disputeing that *Morall virtues are in the mind of Man by habit, and not by Nature*; or formally distinguishing between G*enerous spirits and the obscure vulgar* […] These and the like are farre short of being a just excuse of the deficience of that thing, which now we seek.[156]

Here, we encounter Bacon's invocation of the Stoic right reason as, for example, we find in Diogenes Laertius's (180 CE-240 CE) "Life of Zeno." As he records Zeno's (of Citium, c.334 BCE-c.262 BCE) reflections on the virtuous life, Diogenes further illuminates the relationship between the right reason inherent in all of nature (including human beings) and the moral

589-590).We can only guess at the impact it would have had had it been published in 1607. We can only further guess at the impact Bacon himself would have imagined it to have had on what he surely hoped would prove a progressive career under the still-new administration of James I/VII.

[156] Bacon, *OAPL*, 333-334. Karl Wallace provides what serves as a useful synopsis of this passage: "The faculties of will and appetite were to feeling and action what the rational faculties were to knowledge. Bacon thought of them as the immediate causes of the changes man could recognize in his bodily processes and growth, and in his action and conduct. Appetite was that feature of spirit activity which Bacon called giving and receiving. Its general forms were the consents and aversions, the sympathies and antipathies, among things [viz., goodness, both in man and in nature]. On the other hand, appetite controlled the vital processes of the body and, on the other, guided man's unreflective behavior through his feelings and emotions [the "Affections"]. The will was that mode of mental activity evident in arriving at, and in taking, decisions [note, there is no inherent good or evil in the will-ful decisions, only reason, which can be good or evil]. It [the will] was moved by man's deliberations ["seductions"], and in turn moved him to act or to refrain from acting." Karl Wallace, *Francis Bacon on the Nature of Man*: *The Faculties of Man's Soul: Understanding, Reason, Imagination, Memory, Will, and Appetite* (Urbana: University of Illinois Press, 1967), 154.

virtues which human individuals must consciously cultivate as means to correctly – or, as Bacon would have it, usefully – channel that reason. Human beings must choose and decide to follow the virtuous life, to concertedly subdue their impulses and provide a virtuous conduit for right reason lest it be commandeered by the Idols of the mind or other damaging impulses, affections, and voluntary motions. Only through the conscious activity of moral husbandry can the human animal operate in accordance with the appetitive processes of nature. The human animal is unique in its potential for and responsibility to pursue the goal of virtue, the highest form of which is human charity, i.e., the appetitive deference to the good of the whole (or Good of Communion, as Bacon will refer to it). Diogenes writes,

> nature . . . made no difference originally between plants and animals, for she regulates the life of plants too, in their case without impulse and sensation, just as also certain processes go on of a vegetative kind in us. But when in the case of animals impulse has been superadded, whereby they are enabled to go in quest of their proper aliment, for them, say the Stoics, Nature's rule is to follow the direction of impulse. But when reason by way of a more perfect leadership has been bestowed on the beings we call rational, for them life according to reason rightly becomes the natural life. For reason supervenes to shape impulse scientifically.
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> This is why Zeno was the first . . . to designate as the end 'life in agreement with nature' . . . which is the same as a virtuous life, virtue being the goal towards which *nature* guides us . . . Again, living virtuously is equivalent to living in accordance with experience of the actual course of nature . . . for our individual natures are parts of the nature of the whole universe. And this is why the end may be defined as like in accordance with nature, or, in other words, in accordance with our own human nature as well as that of the universe, as life in which we refrain from every action forbidden by the law common to all things, that is to say, the *right reason* which pervades all things, and is identical with this Zeus, lord and ruler of all that is. And this very thing constitutes the virtue of the happy man and the smooth current of life, when all actions promote the harmony of the spirit dwelling in the individual man with the will of him who orders the universe.[157]

We note that Diogenes closes this passage with the implication that it is up to the individual human animal to "refrain from every action forbidden by the law common to all things." By using the words "refrain" and "forbidden," he can only be referring to the human being. There is no other being in nature, vegetative or animal, whose existence depends on such judgments (which implies wilful, deliberate actions) as those that allow for humans to "refrain" from "action forbidden." Postlapsarian Man especially (for whom we might presume Zeno could not have spoken) must *choose* between right and wrong, good and evil. The human animal

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[157] Diogenes Laertius, *Lives of Eminent Philosophers, Volume II*, trans. R.D. Hicks, ed.Jeffrey Henderson, (Cambridge: Harvard University Press/ Loeb Classical Library, 1925), 195-197. https://www-loebclassics-com.libproxy.york.ac.uk/view/LCL185/1925/pb_LCL185.i.xml. See also, A.A. Long and D.N. Sedley, *The Hellenistic philosophers, Volume 1: Translations of the principal sources with philosophical commentary* (Cambridge: Cambridge University Press, 1987), 394-395. All emphases mine. Also, see again the quotation which appears at the very outset of this thesis.

must consciously decide to abide by "right reason which pervades all things" by virtue of its status as rational being who is thus singularly unique in nature. Mankind has the potential to abide by the right reason which "pervades all things," (again, the *goodness* of right reason is inherent in nature) but that abidance requires the conscious work of virtuousness. We also take note here that Zeno specifies that it is the "individual man" and the "spirit dwelling within him," not a spirit dwelling in a human socio-political collective, who carries this potential to harmonise that spirit "with the will of him who orders the universe."

In his work *On the Republic*, Marcus Tullius Cicero (106 BCE-43 BCE), from whom Bacon also draws considerably, further contradistinguishes the concepts of inherent and consciously-cultivated goodness and moral virtues. Cicero writes, "they say that the wise man is good not because goodness and justice delight him automatically and in themselves but because the life of good men is without fear, care, torment, danger. Some uneasiness always clings to the minds of the wicked."[158] We note, first, the implication here that goodness and wickedness are substantively beholden not to an inherently instilled reason, but to the passions, as the voluntary conduits of the right reason. Man opts for goodness to live a life without fear, etc. As Aristotle maintains, virtues, like art, are manifest in their activation; virtue is as virtue does.

Right reason, as we have seen, is the material and active foundation of nature and so of Man. However, only the human being, out of all that exists in nature, is inherently susceptible to the Idols of the mind; Nature is beset by no such distracting Idols. Therefore, it is the onus of Man (and, moreover, in the context of Christian scripture, postlapsarian Man) to cultivate his goodness, i.e., the positive and appetitive deference to posterity that had indeed been given by God to Adam before the Fall. Bacon, for his part, takes the Fall as existentially read and designs his epistemological precepts around the acceptance of humanity's postlapsarian state.

We note further that in Cicero's dialectic paradigm, men actively cultivate their original goodness by seeking the virtuous life. This points to Bacon's contention that the right reason of the will is the only God-given aspect of the human animal. All after that is a matter of conscious self-discipline which extends from the fundamental human choice between Good and Evil in an earthly context. As Bacon realises, Man is alone in nature, the only living thing given, by God, the onus of choosing whether his right reason shall inform the "secondary" causes of Goodness or Evil. No other creature, no other organism in nature is required to husband such a responsibility.

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[158] Marcus Tullius Cicero, *On the Republic and On the Laws*, trans. David Fott (Ithaca: Cornell University Press, 2014), 94-95.

Like Diogenes Laertius, Cicero discusses the human capacity for right reason and its conditional influence on the human animal. He writes,

> [t]rue law is correct reason congruent with nature, spread among all persons, constant, everlasting. It calls to duty by ordering; it deters from mischief by forbidding. Nevertheless, it does not order or forbid upright persons in vain, not does it move the wicked by ordering or forbidding. It is not holy to circumvent this law, nor is it permitted to modify any part of it, not can it be entirely repealed . . . [a]nd one god will be the common teacher and general, so to speak, of all persons. He will be author, umpire, and provider of this law. The person who will not obey it will flee from himself, and, defying human nature, he will suffer the greatest penalties by this very fact, even if he escapes other things that are thought to be punishments.[159]

We see in Cicero's words that right reason does not ensure correct behaviour in human beings, even though the Idols of the mind may have indeed led men to think they have escaped punishment. Of all creatures, only the human being is capable of steering itself against the natural *and* divine law of right reason. Bacon might himself have thought it intriguing that, for Cicero as for Diogenes, non- or pre-Christian humanity was beholden to the onus of choice between the path of good or evil. For Bacon, reason, goodness, and virtue had human associations before they became joined to the project of divinity.

2.3 The Purpose of Right Reason, Goodness, and Moral Virtue

Bacon proposes the task of reforming moral knowledge as the crucial adjunct to the reform of interpretation and the acquisition of natural knowledge. Moral knowledge, Bacon asserts, has been erstwhile insufficiently handled by authorities who have not adequately treated it as a vital, active, *material* branch of inquiry. Bacon, in his departure from Aristotle, is among the first philosophers of any age to treat goodness and the moral virtues as utilitarian principles rather than merely religious or socio-cultural modes of observable and/or expected correct behaviour.

Returning to the opening passage of the Seventh Book of *De augmentis*, we note that Bacon refers to moral knowledge as a "Science." In Lewis and Short's *Latin dictionary*, the first definition of *scientia* is "*a knowing or being skilled in* any thing."[160] Bacon uses the Latin *scientia* to indicate knowledge of or skill regarding concrete things, as opposed to a categorically *non*concrete *belief* in things. Thus, we note that Bacon opens the Seventh Book of *De augmentis* by attaching an active materialism to his conceptualisation of moral knowledge, which he places in the natural world as a quantifiable, active principle of material

[159] Cicero, *On the Republic*, 98-99.
[160] Charlton Lewis and Charles Short, eds., *A Latin Dictionary* (Chapel-en-le Frith: Nigel Gourlay, 2020), 953.

appetite. He not only treats goodness and virtue as material principles, but, as we will see, practical ones as well.

Bacon seeks to advance "*Good, Virtues, Duties,* [and] *Felicity*" beyond the remit of cursory, superficial, and abstract performances of human behaviour.[161] They are the "true *objects* and scope of Mans Will and Desires," not the sources.[162] As such, Bacon announces his intent to deliver the substantial "precepts and directions, [by which] the *Mind* may be subdued and framed, to pursue and attaine *them*." [163] Moral knowledge, he continues, is not to continue merely as a topic of academic disputation or ecclesiastical prescription. The arguments over whether the moral virtues are intrinsic in Men or learned "habits" are now obsolete. Bacon agrees with Aristotle in this aspect of moral taxonomy, the latter of whom asserts that "[neither] by nature . . . nor contrary to nature do the virtues arise in us; rather we are adapted by nature to receive them, and are made perfect by habit," that is, by use.[164] In Bacon's view, moral virtues represent a material yield from the concerted human husbandry of goodness. Thus, if the natural inquirer "cannot govern nature save by complying with her," he must understand that his first act of compliance is the husbandry of his goodness, which is akin to the primary material of nature only in substance, but not in its efficient cause.[165] To recall our correction of Augustine's Stoicism as discussed by Peter Harrison, it is Man, not God, who is the cultivator of second causes. He (Man) must prepare his own goodness in the same manner he must prepare the soil for planting.

2.4 Conclusion: Reason, Goodness, and Moral Virtue Visible: the Honeybee

I conclude this chapter by constructing a schematic illustration which might help to elucidate Bacon's conception of individual will (right reason), goodness and moral virtue. In *Novum organum*, Bacon invokes the role of the honeybee in nature as an epistemological metaphor for the proper approach to natural inquiry.[166]

Bacon sees reason and goodness in the human animal as actors in an exclusive relationship which resembles that in Nature between the raw pollen of a flower (which might symbolise reason) and the active labours of the honeybee (which we use to symbolise goodness and moral virtue). The pollen, while it is vital to the function of the flower, is externally useless on its own. In its undisturbed state, it promises no yield of beneficial

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[161] Bacon, *OAPL*, 334.
[162] Bacon, *OAPL*, 334.
[163] Bacon, *OAPL*, 334.
[164] Aristotle, *Ethica Nicomachea*, Book II, Section 1, 1103a, lines 20-25.
[165] Bacon, *NO*, 195.
[166] See Bacon, *NO*, "Aphorism 95," 153.

contribution to any greater whole beyond the solitary flower. However, the active goodness of nature – that is, Bacon's respective designation of Individual Good and the Good of Communion, i.e., the good of the one and the good of the whole – is perfectly and inherently contained in the honeybee.[167] The bee is "spurred" (to use Bacon's term) by its own activity of appetitive goodness, to first collect and then transform the pollen of reason into a higher substance which itself becomes the stuff of a higher purpose.[168] That higher substance is realised as nectar in the hive, that is, the community, which further produces honey, which we will consider the metaphorical analogue of *charity*. Thus, bees as a collective whole benefit from the labours of each one's respective genetic goodness and the presiding individual duty to the whole (we should mention that this activity benefits the flower, as well). However, it is first the solitary bee which stimulates the inherent positive potential of the otherwise impotent pollen. The bee as "practitioner" gives itself to its labours according to its "last and highest pitch," that is, according to unimpeachable moral virtues (for the honeybee, these qualities are inherent; in humans, these qualities are, as Bacon, describes, conscious *habit*). Thus is the honeybee's individual duty to the good of the collective fulfilled. The honeybee is the very Baconian picture of "Perfection both of body and mind."[169]

Conversely to the honeybee, due to the obstructive hazards which threaten the undisciplined intellect, Man must consciously invoke his goodness and then cultivate it artificially into his "highest pitch[es]" embodied by moral virtues. Both activities require concerted and voluntary endeavours of husbandry. Unlike the honeybee, who, as an individual, is naturally and inherently good, the human being must construct the perfection of their will, mind, and body. It is only thus that they can effect the meaningful contribution to charity, the higher substance (the honey) born of human endeavour. Similarly, Bacon considers the moral virtues themselves to represent the highest substance, the honey, of the individual human mind and body.

Leaving the honeybee analogy, Bacon considers charity to be the apotheosis of all virtues. As a central tenet of the Great Instauration, Bacon invokes the Pauline precept of Charity as the ultimate goal of natural inquiry and knowledge. "*Charity*," Bacon explains, "[…] is most properly called, *The bond of perfection*, because it comprehends and fastens all virtues together."[170] In Book 1 of *The Advancement of Learning* (1605), Bacon warns that "if

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[167] *OAPL*, 337 ff.
[168] See Bacon, *OAPL*, 333. Also, by Passions, Bacon refers to the voluntary but still *essential* activity which describes and defines a particular organism. The individual honeybee, as far as we can know, does not require a conscious stimulus of discipline to engage in its *natural* purpose (of gathering nectar). The individual human does.
[169] Bacon, *OAPL*, 180.
[170] Bacon, *OAPL*, 361.

[knowledge] bee seuered from Charitie, and not referred to the good of Men and Mankind, it hath rather a sounding and vnworthie glorie, than a meriting and substantial virtue."[171] Charity in the Baconian sense evokes the duty of the practitioner to share the fruits and light of his inquiries with the community.

The passions which "spur" goodness thus serve as the fount of active power for the human mind – the source of human sense and intellect – by supplying the useful, practical attributes of the moral virtues. The virtues indicate the measurable success of an individual's self-disciplined cultivation of goodness and reason. They manifest as outwardly recognisable qualities: selfless patience, bravery, fortitude in the face of personal pain, and even (somewhat ironically, in Bacon's case) a "fluency and elegancy of expression [and] Powers of mans wit;" in sum, those aspects of human behaviour which have been, Bacon notes, "propounded unto us [in] good and faire examples and draughts or accurate portraitures of *Good, Virtue, Duties, Felicity*, as the true objects and scopes of *mans Will and Desires*."[172] Bacon implies that these qualities must be adopted by the natural inquirer to the same degree as they were by Anaxarchus in the torture chamber and Sir Thomas More at the moment of his beheading.[173]

In Bacon's scheme of self-discipline, goodness is voluntarily and concertedly brought by the individual inquirer out of the reason inherent in his will. This goodness then supplies the mindful material of the moral virtues. As a mode of reciprocal husbandry, the moral virtues in the mind supply and reinforce the individual's primary material of goodness. Goodness thus, at once, enables the transmission of useful knowledge to posterity as it returns nourishment to the goodness from whence it came. No part of this process can be left to its own devices. While the reason of the will is inherent in the human individual, the material of goodness, and the forms of moral virtue that extend from the union of reason and goodness, is not. "*Morall virtues*," we recall of Bacon, "*are in the mind of Man by habit, and not by Nature*."[174]

Analogously, we observe the honey which appears in the hive through the labours of the bee. Without the bee, the nectar would remain useless. The hive, like the human mind, remains empty, bereft, without the essential "habit" of the honeybee's labour to gather nectar, to *process it as an individual being*, and then bestow the product of their respective solitary labours to the collective. However, the bee, whose act of collecting nectar Bacon would identify as an example of active goodness, is itself and in its labours, a product of natural

[171] Bacon, *AL*, 7.
[172] Bacon, *OAPL*, 180, 333-334.
[173] Bacon, *OAPL*, 180-181. Bacon lists several historical instances of such "Humane Triumphs."
[174] Bacon, *OAPL*, 334.

goodness and virtue and thus transcends the requisite of habit. The guiding (moral) aegis of those labours which contribute to charity is inherent in the bee. The bee not only transcends the need to husband moral virtues, but itself is *symbolic* of them. Conversely, the individual must consciously invoke his goodness in order to cultivate his virtue, which he then must instil in his mind by "habit," in order to remain on the path to charity.

Chapter 3: Goodness, Moral Virtue and the Baconian Interpretation of Nature

3.1 Goodness, Moral Virtue, and the Methodology of Natural Inquiry

In Bacon's view, natural truth transcends the authority of empirical precision, logical disputation, and certainly a standard of validation accorded by collective sanction. Rather, it manifests as the material product of experiment and subsequent axiom as achieved by the morally disciplined individual inquirer. The virtues of the individual practitioner, which keep the influence of his Idols at bay, provide an integrity of natural inquiry by which the acquisition and transmission of new knowledge escapes the importunate hubris of the *present* and survives to *posterity*. Inversely, the integrity of new knowledge is vulnerable to pressures of collective expectation and thus to the fallibility of empirical correctness, which itself, according to Bacon, is tantamount to *dogma*.[175] While empirical correctness may appease the beliefs of the community in the *status quo* (as does dogma), its weakness lies in the concordant collective expectation that it does precisely that.

As I have discussed above, Bacon's reform of experimental methodology and epistemology begins with the harnessing of the active and positive power of goodness from the reason in the human will. Bacon contends that the voluntary creation of individual goodness and, subsequently, the cultivation of the virtues, enables the natural inquirer's worthy contribution to a posterity, and thus a charity, that he cannot and will not see. The motion toward charity defines goodness, which Bacon, as does Zeno, observes is inherent in nature. Nature, not having to discipline an Idol-compromised intellect in order to be productive, is inherently possessed of right reason *and* the appetitive goodness of that reason. Man, on the other hand, must cultivate his own goodness and manufacture his virtuous habits as he does the other arts he must undertake to survive and to advance. He must apply the artificial material of his goodness to the end of his own preservation, which, as Bacon submits, cannot happen biologically and so must travel forth as useful knowledge; for Man, only his knowledge and works are "secur'd and exempt from the injuries and affronts of time."[176] Nature's works are secured as matter of course through her own inherent material power of goodness.

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[175] Bacon, *NO*, 153.
[176] Bacon, *OAPL*, 343.

Weeks has explored the relationship between artificial and natural material in the context of the "art-nature distinction."[177] As part of her analysis, Weeks invokes Paolo Rossi's dismissal of the material, motive, and essential discrepancies between natural and artificially created matter. Weeks quotes from Rossi's greater contention that

> [a]rt […] is man added to nature […] The fact that the necessary conditions for the existence of a phenomenon are found necessarily connected, or rather, are placed in relation by the human hand does not create a heterogeneity between natural and artificial phenomena. Hence natural motions are not to be contrasted to artificial motions: solar heat can be compared to that of fire.[178]

According to Rossi and Weeks, Bacon emphasises that natural and artificial objects differ only as to their efficient causes. In other words, natural and artificial objects differ only according to the particular activity by which they become forms, that is, how they are shaped into particular collections of matter.[179]A glass sphere manufactured by human hand and human industry is possessed of the same spherical integrity of form as a stone. All objects, or forms, in Bacon's view, are made of the same matter, regardless of where they classify under any of his three states of nature.[180] Matter is matter whether nature "is either free, and unfolds itself in its ordinary course [like a stone]; or it is torn from its course by the crookedness and arrogance of matter and by the violence of impediments [what Bacon also calls "monsters"]; or it is restrained and moulded by art and human agency [as the glass sphere]."[181]

It is according to this scheme that the individual must manufacture his own material efficient of goodness. Goodness is the human primary appetitive, material from which the moral virtues extend.[182] The goodness and virtues in humans are materially analogous to those in nature, but not in their efficients, that is, in how they become forms. Here, we revisit Bacon's matter theory, which he evokes through the myth of Cupid.[183]

In Bacon's view, Cupid, or Love, symbolises matter in the universe and "relates to the cradle and infancy of nature."[184] Chaos, from which Cupid emerges, is what Bacon affirms as

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[177] See Weeks, "Art-Nature Distinction," 101-129.
[178] Paolo Rossi, *Philosophy, Technology and the Arts in the Early Modern Era*, trans. Salvator Attanasio (New York: Harper & Row, 1970), 139; Weeks, "Art-Nature Distinction," 103.
[179] Weeks, "Art-Nature Distinction," 102.
[180] See Bacon, *PAH*, 455. Bacon explains that "natural history is threefold. For it deals either with the *liberty* of nature, or its *errors* or its *bonds*; so that we can divide it into *History of Generations*, of *Pretergenerations*, and of *Arts*, the last of which I have also got used to calling *Mechanical and Experimental*. Nevertheless, I do not advise that these be dealt with separately."
[181] Bacon, *PAH*, 455.
[182] See Bacon, *OAPL*, 333 ff.
[183] Graham Rees, "Introduction," in *The Oxford Francis Bacon, Vol. 6: Philosophical Studies, c.1611-c.1619*, by Francis Bacon, ed. Graham Rees, trans. Graham Rees and Michael Edwards (Oxford: Clarendon Press, 1996), xxix.
[184] Bacon, *DSV*, 729.

the "uncreated mass […] of matter."[185] He explains that "matter itself, its power and nature, and in fine the principles of things, has been shadowed forth in *Cupid* himself."[186] Thus, Cupid represents both the substance *and* the creative, motive act of matter. Bacon notes that Cupid is seen by the ancient creators of the myth "to be coeval with [Chaos]."[187] The potential for material being of Cupid is inherent in Chaos. We can interpret a congruous dynamic between the inherent reason in the human will, which corresponds to Chaos, and the primary human material of goodness, which corresponds to Cupidic primary matter.

Weeks concludes that "[t]he eternity of matter implies neither further creation nor destruction of its original quantum. It is a fundamental principle of Bacon's vision that this quantum will make further use of its hidden powers when vexed or bound [by human artifice]."[188] As Weeks affirms, Bacon contends that all matter and motion, whether free in nature or bound by the artful hand of Man, are joined by the same quality of *appetite*.[189] This particular point is central to the argument of the thesis, wherein the artificial – or, as aptly, the *voluntary* – Cupidic state of human goodness may be considered parallel to the intrinsic state of goodness in nature.

Bacon applies the term *virtue* not just according to its association with what we might identify as conventional moral moods or behaviours, but as it relates to material dynamics both in the natural and artificial world. He uses the word to the same semantic effect in both his Latin and English texts. The *OED* defines *virtue* as "a specific power or quality," in particular, "a power inherent in a thing; a capacity for producing a certain effect; an active property or principle; a faculty."[190] Here, *virtue* implies and describes a physical, material state. It is a signifier of real appetitive power. For Bacon, all things in nature are possessed of the same virtues, that is, the tropic tendency toward the optimum good of the collective whole (again, what Bacon call the Good of Communion), whether a lump of raw ore or a human being.[191]

The Latin usage of the term, the root of which is *virtus*, inhabits the same semantic field as its English descendant. However, Lewis and Short reveal the first definition of the root *virtus* as "manliness, manhood, i.e. the sum of all the corporeal or mental excellences of man; *strength, vigor*; *bravery, courage*; *aptness, capacity*; *worth, excellence*."[192] Importantly,

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[185] Bacon, *DPAO*, 199.
[186] Bacon, *DPAO*, 199
[187] Bacon, *DPAO*, 197.
[188] Weeks, "Art-Nature Distinction,"118.
[189] Weeks, "Art-Nature Distinction," esp. 107-108.
[190] *OED*, "virtue, n.," accessed April 2, 2022, https://www-oed-com.libproxy.york.ac.uk/view/Entry/223835?rskey=UYA3v3&result=1.
[191] See Bacon, *OAPL*, 337 ff. and *passim.*
[192] Lewis and Short, *Latin Dictionary*, 1161.

we again see the invocation of physical, material aspects to virtue which are equally pertinent in corporeal, psychological, and natural contexts. Virtues indicate the measure of Cupidic material goodness an individual has shadowed forth from the Chaotic pre-matter of his will much in the same way the wind serves to indicate its inherent Cupidic material goodness in nature. To continue the metaphor, the wind serves both human and bird. However, where the bird comes into existence equipped with wings, the human being must construct sails and windmills to harness the same appetitive power. Man's goodness and the works that extend from it, in Bacon's view, puts him on equal footing with nature (see again Bacon's quote which begins the thesis).

Thus, we might consider the virtues in Bacon's philosophy – in the forms of fortitude, faithfulness, etc. – to be possessed of an analogous *material* consistency to virtues in nature.[193] Moral virtues as qualities and companions to the intellect are thus eminently *useful* to Man and his art in the same way a form in nature is eminently useful to Nature (though she need not consciously act to make that so). Both forms, the artificial in humanity and the natural in Nature, fulfill a *duty* to the preservation of the collective whole. The material of goodness in the human context, though an artificial construct, nonetheless possesses the same formative integrity and potential as does the goodness in nature. Bacon desires that Man conform to this congruity because nature represents a manifest success of self-preservation and beneficence in her own right. The charitable "bonds of perfection" are no more perfect, Bacon believes, than in nature.

In Bacon's view, it is Man's duty to harness the latent and unused power "folded" into what Weeks identifies as "nature-free" and mould it into useful works, that is, to transform "nature-free" into "nature-bound."[194] Weeks identifies this artificial process as "magic."[195] She writes, "Bacon designated the systematic procedures of binding nature the science of magic. Magic is Bacon's human counterpart to the original cosmogonical process that gave rise to the current system of nature."[196] Weeks' analysis helps to confirm the thrust of this thesis. Magic is what the human being uses to recreate, emulate, or amend original cosmogonical processes through their own manipulation of natural matter and natural forms. To reiterate: it thus follows that goodness is that which one shadows forth as the primary material from the reason of their will in the same manner that Cupid has brought primary matter out of Chaos.

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[193] See passage from *OAPL* quoted at the start of Chapter 1, p. 10 (Bacon, *OAPL*, 360).
[194] Weeks, "Art-Nature Distinction," 127.
[195] Weeks, "Art-Nature Distinction," 127.
[196] Weeks, "Art-Nature Distinction," 127.

The analogous forms of the good in humanity and the good in nature equally represent active and appetitive motion in Bacon's view. Bacon contends that all things in nature are intrinsically possessed of goodness in its two primary natures:

> There is imbred and imprinted in every thing an appetite to a duple *Nature of Good: the One as everything is a Totall or Substantive in it selfe*: *the other as it is a part or member of some greater Totall*: and this *latter* is more excellent and potent than the *other*, because it tendeth to the conservation of a more *ample forme*. *The first may be called Individuall or Selfe-good; the latter the Good of Communion*.[197]

Silvia Manzo provides a useful anatomy of Bacon's "Double Nature of the Good."[198] The 'double'-ness in Manzo's case pertains to the good which occupies a dual simultaneous classification in both *natural* and *moral* philosophy. Manzo helps us understand how the virtues in Bacon's work fit the discussion of "universal appetites, through which the correlations between natural and moral philosophy [can] be shown."[199] Her invocation of "appetites" reminds us that Bacon treats goodness, and thus, the subsequent *forms* of the virtues, as possessed of material principles (again, as we have seen in Gaukroger's and Weeks' analyses, all matter in Bacon's natural philosophy is appetitive and, as such, qualifies as matter).[200] Manzo illuminates the duality that science inhabits in Bacon's epistemological view. While Bacon, she writes, recognises the

> parallel between science and reality, […] he [also] seems to believe that the objects of the various sciences, such as nature and man, are at the more general level governed by common laws imposed on them by God […] Given these premises, it is easy to understand why Bacon thought that, in order to discover the appetites in human beings, moral philosophers should pay attention to the appetites of natural things.[201]

Manzo, like Weeks, thus contributes to the foundation of my argument which holds that Bacon's project of natural inquiry is also a project of human moral discipline, and vice versa. Experiment and observation are the means by which one not only discovers external natural truths, but, further, how they exercise and prove their own moral self-discipline through that inquiry. To again invoke the Aristotelian view, virtue is as virtue does.

We may, ourselves, employ a scriptural reference to confirm the natural-material rather than spiritual (or at least divinely Christian) quality of Bacon's moral virtue. My thesis concludes that Bacon's philosophy is not possessed of an agenda to reinstall Adam in the

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[197] Bacon, *OAPL*, 337.
[198] Silvia Manzo, "Chapter 8: The Ethics of Motion: Self-Preservation, Preservation of the Whole, and the 'Double Nature of the Good' in Francis Bacon," in *Motion and Power in Francis Bacon's Philosophy*, eds. Guido Giglioni, James Lancaster, Sorana Corneanu, and Dana Jalobeanu, (Dordrecht: Springer, 2016), 175-200.
[199] Manzo, "Ethics of Motion," 176.
[200] See Weeks, "Art-Nature Distinction," 106-107; Gaukroger, *Transformation*, 93.
[201] Manzo, "Ethics of Motion," 177.

Garden of Eden.[202] His intent is to effect humanity's successful habitation and use of the world to which that humanity is bound. The task is, by necessity, a profane one. That is, it involves the direct relationship between humanity and second (i.e., natural) causes. Bacon enters no argument against the sentence dealt Adam and Eve, but, instead, rationalises it. He writes,

> [I]t was not the pure knowledge of nature and vniversality, a knowledge by the light whereof man did giue names vnto other creatures in Paradise, as they were brought before him, according vnto their proprieties, which gaue occasion to the fall; but it was the proude knowledge of good and euill, with an intent in man to giue law vnto himself, and to depend no more vpon Gods commaundements, which was the fourme of the temptation.[203]

Rather than effect the rehabilitation and the rehabitation of Adam (or postlapsarian humanity) in Eden, or, for that matter, to rebuild a second Eden from new material within the fallen estate of Man, Bacon's project is designed to effect postlapsarian humanity's maximum knowledge and use of *nature* as only they, as human beings, are capable of understanding it. If he is suspicious of empirical, dialectical, and dogmatic excess, it is because he is eminently *pragmatic* according to the original Greek meaning of the word: of or relating to *deeds*.[204] Postlapsarian mankind must concern itself with hands-on active utility, that is, pursue a profound bond of understanding with the stuff of Creation – nature – and the useful potential therein. In this sense, Man must devote his duty of faith and obeisance to God to improvement in the realm of the profane. As Bacon has expressed above in *The Advancement of Learning*, the realm of the profane itself is a part of God's Creation.[205]

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[202] Jim Bennett and Scott Mandelbrote provide insight into the beginnings of John Milton's *Paradise Lost* in their study, *The Garden, The Ark, The Tower, The Temple: Biblical metaphors of knowledge in early modern Europe*, (Oxford: Museum of the History of Science in association with the Bodleian Library, 1998). The authors investigate the influence of Christian scripture and philosophy on the burgeoning disciplines of inquiry and learning in early modern Europe. Entry 68 informs us at its outset that Milton had an early association with Samuel Hartlib. The two "collaborated on several fronts during the 1640s, sharing an interest above all in the reform of education." (Bennett and Mandelbrote, *Biblical Metaphors*, 166) Bennett and Mandelbrote briefly discuss Milton's work and publication history of *Paradise Lost*, noting, "Despite the heterodox beliefs of its author, *Paradise Lost* succeeded in becoming both a model for English verse and a popular guide to the interpretation of the opening chapters of Genesis, whose story it dramatized." (166) We must wonder whether there may perhaps be a tendency amongst scholars in the history of science to graft Milton's great work, which veritably opens with the explicit suggestion that Eden only remains lost "till one greater Man/Restore us, and regain the blissful seat" (in Bennett and Mandelbrote, *Biblical Metaphors*, 167) onto the motivational dynamics of early modern natural inquirers. Milton published *Paradise Lost* in 1668, which would have been closely contemporaneous with the newly-formed Royal Society and the early Baconian momentum of its projects. However, the thesis adheres to the contention that Bacon, who died in 1626, accepted the loss of Eden and sought to provide for the welfare of Man's estate according to the realities of the postlapsarian paradigm of human existence in nature.

[203] Bacon, *AL*, 6.

[204] *OED*, "pragmatism, n.," accessed March 18, 2022, https://www-oed-com.libproxy.york.ac.uk/view/Entry/149295?redirectedFrom=pragmatism.

[205] See again, Bacon, *AL*, 188.

Bacon is far more of a pragmatist than he is a sceptic. He seeks to eliminate the weaknesses of the human mind that obstruct the interpretation of nature, Fall or no Fall. Thus, that Man must now, in his postlapsarian state, build and harness the power of goodness from his will in order to interpret a natural world that he not only once inherently understood but commanded from a seat of plenipotentiary divine authority, is not penance for Original Sin. Instead, goodness and virtue in Bacon's mode of thinking represent a pure substance of pragmatism. It is a part of Man's moral – and earthly – duty, not religious duty, to subdue the importunate Idols that obstruct an intellect he so urgently needs to process his sensory experience, to devote himself to useful works and useful knowledge.

3.2 The Good of Communion as a Project of the Self-Good

Bacon holds that the tendency to preserve the whole, the Good of Communion, is the strongest force in nature, which, of course, includes the world of humanity. The Good of Communion represents the supreme objective of the respective and combined *individual* moral duties of the many. In keeping with the fidelity to posterity, Bacon measures the positive moral power of individual knowledge according to its eventual success in contributing a benefit to the whole of humanity. One's duty to the Good of Communion thus begins with the individual (primary) material of Self-Good and the guiding motive *forms* of individual moral virtue. Bacon explains,

> The *Good of Communion*, which respecteth *Society* […] is commonly termed by the name of *Duty*, because the terme of *Duty*, is more proper to a mind well fram'd and dispos'd towards others; the terme of *Virtue*, to a mind well form'd and compos'd in it selfe. But this part at first sight may seeme to pertaine to *Science Civile*, or *Politique*, but not if it be well observed; for it concerns the Regiment and Government of every man over himselfe, and not over others.[206]

Bacon maintains that the proper maintenance of Self-Good enables the proper fruition of the Good of Communion.[207] Such a "double duty" of Self-Good manifests in parallel contexts of, one, the individual citizen's duty to society and, two, the individual natural inquirer's duty to return new knowledge to the whole through his contribution to the natural histories. The natural inquirer, like the ascetic monk, cannot – and should not – expect earthly reward or even visible results from his endeavours. However, the communitarian (we might say *political*) project of humanity requires – and deserves, in Bacon's view – the perpetual effort

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[206] Bacon, *OAPL*, 346-347.

[207] Bacon devotes the Seventh Book of *De augmentis* to the fundamental natural properties of Self-Good, or Individual Good (*Bonum individuale*) and the Good of Communion (*Bonum communionis*). (Bacon, *De augmentis* (original Latin)), 348. Bacon writes, "There is imbred and imprinted in every thing an appetite to a *duple Nature of Good: the One as everything is a Totall or Substantive in it selfe* [this is the Self-Good]; *the other as it is a part or membre of some greater Totall* [this is the good of Communion]" (Bacon, *OAPL*, 337).

of moral perfection on the part of the individual. This perfection enables the successful transmission of knowledge by which the fruits and light of individual inquiry provide for the benefit of the whole.

Bacon again illustrates the relationship between individual and society within the context of the collective at large, be it social, scholarly, or scientific in nature. Bacon treats the forms of individual moral virtue as the precedent "bonding" matter of the Good of Communion. Just prior to the preceding quotation in Book 7 of *De augmentis,* he writes,

> this kind of knowledge, touching *Respective Duties*, doe also appertaine the *Naturall Duties* between Husband and wife, Parents and Children, Master and Servant: so likewise the lawes of Friendship and Gratitude; as also the Civile bonds of Corporations, Companies, Colledges, Neighbour-hood and the like. But it must ever be presupposed, that they are here handled, not as parts of *Civile Society* (for that is referr'd to the Politiques) but as to the framing and predisposing of the Minds of Particular persons, to maintaining of those *Bonds of Society*.[208]

Bacon shows us that the "bonds of society" begin in "the minds," that is, amongst the intellect and the virtues, "of particular persons." The Good of Communion and the supreme objective of charity, or what we might call the *summum bonum,* begins with the cultivation of the Self-Good.

In the same way that the Good of Communion begins from the Cupidic seed of the Self-Good, so the posterior collective benefit of natural inquiry extends from the Cupidic efforts of the individual inquirer. In Bacon's view, a facile success which satisfies a contemporary popular taste for novelty but ultimately transmits nothing beneficial to posterity is fundamentally useless. Conversely, an ingenuous labour of individual inquiry deemed fruitless for its lack of success according to contemporary collective standards may ultimately reveal itself a benefit to posterity. Therefore, nothing is to be dismissed in Baconian inquiry, only duly and assiduously recorded. Bacon implores "that we must not adopt just Experiments of the Arts which lead directly to the purpose of the art in question but also those that in any way crop up in the process."[209] This facet of his methodology alone would seem to disqualify collective participation in inquiry. For the individual, natural inquiry is an ongoing process; for the collective, it is a means to a result. Too often, Bacon laments, the interpretation of nature is engaged to satisfy vanities, which draw on infertile traditions and suit only the present. Thus, in a corrective admonition aimed at the intransigent traditions inherent in the collective present, Bacon imperatively demands, "no more of antiquities, citations and differing opinions of authorities, or of squabbles and controversies, and in short, everything

[208] Bacon, *OAPL,* 351.
[209] Bacon, *PAH,* 463.

philological."[210] This would seem, if anything, to be a full entreaty to the inquirer that he all but sequester his "particular mind" from the clatter of the community, not seek its consent.

Bacon asserts "that the *Quantum* of Nature is eternall."[211] Unlike human beings, Nature does not need to take conscious pains to further itself into perpetuity, nor does it require consensus to do so. Even events in nature that appear (to human observers) as random and senseless episodes of destruction yet contribute to the successful preservation of the natural whole. Not only can nature, like matter, not destroy herself even as her forms change, she is intrinsically disposed to flourish even in her wild state (even as much of her inherent potential thus remains unrealised). Her destruction-creation dialectic works in effortless harmony.

Bacon understands this. He at once subjects human endeavours to the proof born only of the "consent" of time and nature.[212] He clearly expresses his suspicion of collective assent and accepted antiquated authorities: "On the subject of authorities, it is the height of pusillanimity to attribute everything to them but to deny time its rights which is the author of authors and indeed of all authority. For truth is rightly called the daughter not of authority but of time."[213] Bacon's invocation of time necessarily invokes the notion of posterity. Posterity, where the work of the inquirer lives beyond the *life* of the inquirer, is the proving ground of charity. The natural inquirer's deference and dedication to charity and posterity begins with his Cupidic invocation of goodness from the Chaos of the will. Thus, it follows that the goodness and moral virtue that guide individual natural inquiry and the acquisition of new knowledge act as one's "natural" agents of utility, beneficence, and charity.

3.3 The Self-Discipline of Sense and Intellect

Bacon's admonishes *passim* throughout his works that natural inquiry be carried out by means of sensory-intellectual experience. However, he appends a caveat to the practice of the sensory-intellectual inductive discipline. He specifically prescribes that sensory observation must operate in strict accord with the disciplined intellect, the one controlling the other. This co-operation ensures the proper cognitive pace and scope of inquiry. Bacon urges that the inquirer's methodological process "[draw] axioms by climbing steadily and by degrees so that it reaches the ones of highest generality last of all."[214] He warns that the human mind is

[210] Bacon, *PAH*, 457.
[211] Bacon, *AL*,77. See also, Weeks, "Art-Nature Distinction," 108.
[212] See Bacon, *AL*, 90.
[213] Bacon, *NO*, 133.
[214] Bacon, *NO*, 71.

dangerously satisfied by a minimum of sensory evidence and will backfill its premature conclusions with disputatious logic that "scorns experience."[215]

Thus we arrive at another platform from which we can question the historiography which holds that Bacon's natural inquiry is designed to be a collective endeavour. Bacon expends a great effort throughout his works to illustrate how collective involvement and the influence of communitarian beliefs impinge on the individual practitioner's endeavour of natural inquiry. He warns that the "*Anticipations of Nature* (which concede to the tendency of undisciplined human reasoning toward 'impetuous and premature proceeding') are strong enough to purchase common consent; seeing that even if men went mad in the same copycat way, they could still agree among themselves well enough."[216] Collective input into the methodology of inquiry interrupts valid, ingenuous questions about nature that are based in the disciplined operation of individual sense and intellect and transcribed from the individual's personal engagement (what Bacon will call a "marriage-song") with nature.[217] The traditions – and *beliefs* – held by the community, rather than guide the inquirer, instead compromise the sensory-intellectual sanctity of experiment. The opinions, vanities, and subterfuges, which, as Bacon *does* allow, may serve to facilitate social and political relations amongst the collective, not only undermine the integrity of the questions to be tested, but commandeer the crucial construction of the resulting observations and axioms as well.[218] Bacon advises prophylaxis on the part of the inquirer:

> The *Idols* and false notions which now garrison the human intellect and are well dug in there, do not just so obstruct the minds of men that the truth has difficulty gaining access, but even when access is granted and allowed, they oppose the actual instauration of the sciences and plague it, unless men are forewarned and arm themselves against them as far as they possibly can.[219]

Here, we might ask of Bacon with what forewarned men should arm themselves. His answer would most likely be that inquirers into natural truths should arm themselves with the primary material of goodness and its formative collective subsidiary of the moral virtues. Indeed, the aphorism above might serve well as the heading for Bacon's moral, as well as sensory-intellectual, project of natural inquiry.

At the outset of *Novum organum* (1620), Bacon succinctly asserts that "[m]an, the servant and interpreter of nature, does and understands only as much as he has observed, by fact or mental activity, concerning the order of nature; beyond that he has neither knowledge

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[215] Bacon, *NO,* 71
[216] Bacon, *NO,* 75.
[217] Bacon, *OAPL,* 30.
[218] See Bacon's 1625 essay, "Of Simulation and Dissimulation," *Ess,* 20-23.
[219] Bacon, *NO,* 79.

nor power."[220] In order to properly undertake the tasks of natural interpretation as a "servant of nature" so that the work of the inquirer will result in useful knowledge and useful works, the human intellect must be cleansed of any immediate motive other than to serve as the impartial instrument of the individual sense-experience. Sense-experience and intellect must work together in balance, a condition which requires a human discipline of the utmost integrity. This endeavour of discipline precedes the prescriptive framework for Bacon's inductive methodology, which he distinguishes from the insufficient reductive tendencies "in current use."[221] As concerns the proper use of the senses, Bacon instructs:

> There are and can only be two ways of investigating and discovering truth. The one rushes up from the sense and particulars to axioms of the highest generality and, from these principles and their indubitable truth, goes on to infer and discover middle axioms […] The other way draws axioms from the sense and particulars by climbing steadily and by degrees so that it reaches the ones of highest generality last of all; and this is the true but still untrodden way.[222]

Here, Bacon describes the hazards of mis-using the senses to support hasty, premature, and presumptuous conclusions. The senses must be kept under strict disciplinary control so that they only arrive at the "highest generalit[ies]" via the steady climb through sober degrees, each of which produces a sovereign, verifiable axiom. The progression through each degree must be the product of what Bacon call *Interpretations* (as opposed to the aforementioned *Anticipations*) *of Nature*.[223]

The strict discipline of the senses is enabled and reciprocally mediated by the strict discipline of the intellect (the latter necessarily implies moral discipline). Bacon ascribes the same behavioural tendencies to both. Having introduced us to the correct use of the senses in the quote above, Bacon offers the corresponding correctitude in the use of the intellect:

> The unaided [i.e., undisciplined] intellect takes the same way (i.e. the former) which it takes when directed by dialectic. For the mind longs to leap up to higher generalities to find rest there; and after a short while scorns [sensory] experience. But in the end this evil is made worse by dialectic used for the sake of ostentatious disputations.[224]

This thesis endeavours to re-affirm Bacon's intention that the unified condition of sense-experience and intellect be brought by the practitioner to effect what Weeks has identified as "the union of the mind (*mens*) with things (*res*). […] [which] is a necessary

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[220] Bacon, *NO,* 65.
[221] Bacon, *NO,* 71.
[222] Bacon, *NO,* 71
[223] Bacon, *NO,* 75.
[224] Bacon, *NO,* 71.

condition of inquiry."[225] Weeks further emphasises Bacon's proviso that "[i]nquiry begins with the senses which, although weak and insufficient, are nonetheless the first point of contact with nature."[226]

I would supplement Weeks' analysis with the qualification that, if the senses are the first point of contact with nature, *that* contact, according to Bacon, must be preceded by the contact between inherent reason, voluntary goodness and the habits of virtue in the mind of the inquirer.[227] In particular, the voluntary (or, artificial) goodness of the individual inquirer provides the moral and intellectual basis upon which the senses engage with nature properly and direct inquiry toward the ultimate goal of utility, human beneficence, and charity. In Bacon's view, the practitioner who would undertake natural inquiry without having properly cultivated his own potential for goodness and moral virtue undermines both the present integrity of experiment *and* the posterior integrity of useful knowledge.

In order to understand Bacon's provisions for the interpretation of nature, we must also analyse his conception of good and virtue in the material sense. According to Bacon, the moral virtues represent "*the last and highest pitch, to which mans Nature of it selfe hath ever reach't in all the Perfections both of Body and Mind*."[228] Bacon enthusiastically reminds his readers that "the Trophies of Morall virtues […] are no less famous than those of Intellectual virtues."[229] This latter statement is particularly pertinent to my thesis, which asserts that Bacon's philosophy requires moral virtue to occupy equal territory with intellectual virtue in the human mind.[230] Recalling Weeks' assessment above, nature, which need not mediate "a

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[225] Sophie Weeks, "The Role of Mechanics in Francis Bacon's *Great Instauration*," in *Philosophies of Technology: Francis Bacon and his Contemporaries*, eds. Claus Zittel, Gisela Engel, Romano Nanni, and Nicole C. Karafyllis, (Leiden: Koninklijke Brill, 2008), 148.
[226] Weeks, "Role of Mechanics," 149.
[227] Again, see passage from *OAPL* quoted at the start of Chapter 1, p. 10 (Bacon, *OAPL*, 360).
[228] Bacon, *OAPL*, 180. Bacon lists examples of such behaviour in *OAPL*, 180-181. At this point early in Book 4, he calls for a companion to the Natural Histories in the form of "a Collection . . . made of the Ultimities . . . or Summities . . . of Human Nature . . . out of the faithfull reports of History." He includes the story of Sir Thomas More's reply to the barber who has come to cut his hair the day before his execution.
[229] Bacon, *OAPL*, 180.
[230] See John Peterson, "The Interdependence of Intellectual and Moral Virtue in Aquinas," *The Thomist: A Speculative Quarterly Review* 61, no. 3 (July 1997): 449; also, Bacon, *OAPL*, 336. Bacon is intent in his philosophy to extend moral virtues beyond the Aristotelian remit of pure contemplation, or, to use the precise Thomist/Aristotelian term, "happiness." Thus, Bacon also amends the Thomist discussion of the relationship of intellectual and moral virtue by appending the provision that goodness and moral virtue in men are to be assessed not only against the Aristotelian objective of happiness, but against the degree to which those qualities prove their utility and beneficence to humankind. John Peterson describes the Thomist/Aristotelian distinction between the natural and supernatural natures of human beings: Aquinas sees the earthly lives of humans as being governed by a "natural end," which, as Peterson points out, "is identified by Aquinas with imperfect, as opposed to perfect or ultimate, happiness. But viewed as the latter, persons have a supernatural end." (Peterson, "Interdependence," 449) We are hence given the Thomist/Aristotelian association of the "natural" with the "imperfect," which extends to the inverse association of the "supernatural" with the "perfect," especially as the latter adjective applies to "happiness." Bacon, for his part, while certainly acknowledging the imperfection of natural man, rather admonishes that man *work* within the imperfect sphere as the means to achieve a success of utility *in that sphere* instead of indulging himself with the *non possumus* that the imperfect is categorically

union of *mens* and *res*," is inherently equipped with her own facility for the transmission of beneficence to posterity.[231] The active *virtues* which indicate the working appetitve goodness of nature in the present serve also to promise the preservation of the natural whole in the future.

3.4 Natural Inquiry as Individual Pursuit: a Prefatory Discussion of Robert Boyle

Bacon intends the initial sensory-intellectual performance of natural inquiry to be a fundamentally individual activity. The epistemological and methodological scheme of natural inquiry begins with the individual inquirer's consultation of existing natural histories. He then constructs and performs his experiments to his best abilities of sensory observation and intellectual interpretation, trusting his morally disciplined powers of induction. He enters no mindful judgment on behalf of his senses, and he is simultaneously aware that his senses themselves are fallible. He is himself, as the primary instrument of inquiry, beholden to the limits of his sensory experience and to his intellect which, as I have noted above, must work in a context of close symbiotic discipline with the senses. The inquirer, as Bacon submits, serves only as the scribe to nature in the process of experiment.[232]

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limited in its potential because it does not fall under the jurisdiction of the supernatural. Charity, as Bacon brings out of both St. Paul and the Stoics, is the agent which allows for perfection in the Thomist natural sphere of humanity. In this Baconian sense, Man, while part of the divinely created world, must yet bear the responsibility for the stewardship of that world. The supernatural in Bacon's philosophy must not pre-empt man's attempt to cultivate, to master, the imperfect world, that is, the realm of second (natural) causes rather than first (divine) causes. Man's moral substance must be of the tangible earth, not the unknowable heavens. Bacon illustrates this point when he writes, "those infinite Disputations and speculations *touching the supreme degree of Good*, which they terme *felicity, Beatitude*, the *highest good*, (the Doctrines of which were the Heathens Divinity) are by the Christian Faith, taken away and discharged. For as *Aristotle* saith, *That Young men may be happy, but not otherwise, but by hope*; so must we all, being taught by the Christian Faith, acknowledge our selves to be but children and in our Minority; and think of no other felicity, than that which is in hope of the future world." (Bacon, *OAPL*, 336). Thus, the "rationality" of the Thomist/Aristotelian imperfect world must, in Bacon's vision, be applied to utility and a superlative acumen in harnessing the powers inherent in the second causes. The Thomist/Aristotelian condition of imperfect or perfect "happiness," as analysed by Peterson, is a superfluous concern for Bacon. Happiness, in its inactive contemplative form, does not satisfy the criteria for utility and, thus, neither can it lead to charity. The Aristotelian individual is an end in itself; the Baconian individual is the first element of the Good of Communion, or the good of mankind.

[231] See Weeks, "Role of Mechanics," 148.

[232] Bacon, *PA*, 260-261; Bacon differentiates between conclusions and speculations in the course of experiment. Both are necessary epistemological facets of the interpretation of nature, as are the inevitable sagas of trial and error, the records of which Bacon insists must be included in the literature of the experiment. However, with that, Bacon warns against speculation serving as conclusion. Bacon issues consistent provisions for this distinction passim throughout his works. We may consult the *Parasceve* (or, Preparative to a Natural History) appended to *Novum organum* (1620) for an example of Bacon's epistemological position. On the one hand, he writes, "the more difficult and onerous this work [of natural inquiry] is, the more it should be relieved of superfluities . . . In the first place then, no more of antiquities, citations, and differing opinions of authorities, or of squabbles and controversies, and, in short, everything philological." (*PAH*, 457). On the other hand, or, rather, on the other side of the same hand, he counsels that, "if there is anything in any narration which is doubtful or worrying, I would not at all want it to be suppressed or kept quiet but to be put in writing plainly and clearly by way of a note or advice." (*PAH*, 469).

For Bacon, experiment itself serves as the corrective mediator between the mind (*mens*, the seat of sense and intellect) and things (*res*, or Nature).[233] He explains, "we bring the matter to this issue, that sense may judge only of the experiment, the experiment of the thing."[234] There is, at the point of experiment, no place for expectation, which can only lead to *Anticipations*. There is only process. Bacon here describes an extremity of asceticism rather than empirical execution. Indeed, as I have discussed above, Bacon invokes the solemnity of a holy marriage between Nature and the inquirer as exists between God and the ascetic. Bacon admonishes that, in the business of experiment and natural interpretation:

> the intellect cannot make a judgement but by Induction, *and by* a legitimate forme thereof. *Wherefore* the Doctrine of purifying the understanding, *that it may become receptive of truth, is perfected by* three Reprehensions: Reprehension of Philosophy, Reprehension of Demonstrations *and* Reprehension of Native humane Reason. *These explicated, and then the case cleered, what the nature of things, what the nature of the mind is capable of we presume* (*the Divine goodnesse being President at the Rites*) *that we have prepared and adorned, the Bride-chamber of the* Mind and of the universe. *Now may the vote of the Marriage-song be*, that from this coniunction, Human Aides, and a Race of Inventions may be procreated, as may in some part vanquish and subdue mans miseries and necessities.[235]

It is thus, through the individual submission to induction, the reprehension of received philosophy, and the entrance into the private "bride-chamber of the mind and the universe," that the inquirer, whose spouse is Nature, procreates the race of inventions that bestow pure charity.

It is in light of Bacon's appeal for comprehensive reprehensions and the marriage of mind and universe that I invoke the works, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (1985) by Steven Shapin and Simon Schaffer, and *A Social History of Truth: Civility and Science in Seventeenth-Century England* (1994) by Steven Shapin. Both works are products of the Sociology of Scientific Knowledge, or SSK, a school of historiography that began in Great Britain in the late 1960s.[236] In their respectively

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[233] See Weeks, "Role of Mechanics,"148.
[234] Bacon, *OAPL*, 28.
[235] Bacon, *OAPL*, 30.
[236] SSK represents a vast province of epistemological and methodological discourse in the realm of post-Mertonian relativism and constructionism. Malcolm Ashmore provides a ready definition: "the sociology of scientific knowledge . . . is a matter that will be settled, or socially constructed, by a process of *negotiation* among the discipline's practitioners, commentators, and critics. At the same time, such negotiations are also about just who is to count as a recognised practitioner or commentator or critic of the sociology of scientific knowledge." Malcolm Ashmore, *The Reflexive Thesis: Wrighting Sociology of Scientific Knowledge* (Chicago: The University of Chicago Press, 1989), 2. Harry Collins, one of the school's noteworthy authorities, explains that "the sociology of scientific knowledge . . . is concerned precisely with what comes to count as scientific knowledge and how it comes to count. The crucial phrase here is 'comes to count' since no knowledge of what lies hidden beyond human scientific activity is claimed." H.M. Collins, "The Sociology of Scientific Knowledge: Studies of Contemporary Science," *Annual Review of Sociology* 9, no. 1 (August 1983): 265-285. https://www.jstor.org/stable/2946066. However, authors such as Thomas F. Gieryn, argued in the early 1980s

collaborative and independent researches, Shapin and Schaffer – especially Shapin – concentrate their arguments on the seventeenth-century natural philosopher and experimenter, Robert Boyle. Shapin and Schaffer together, and Shapin alone, pursue an historiographical model of Boyle as a figure whose success and credentials as an experimental practitioner are enabled by his status as and position amongst a community of British gentlemen, specifically that of the Royal Society. This community, they argue, was epistemologically united by bonds of trust that supplied the power to, "constitute[e] systems of both social order and empirical knowledge."[237]

That the primary temporal focus of Shapin's and Schaffer's studies begins in 1660 and centres on the formation of the Royal Society warrants emphasis. The argument for the relationship between social status, socio-political order and empirical knowledge certainly carries strength in the case of Restoration – and, I might add, Boylean – England. However, we must note that the paradigm of collective methodology and epistemology that would be championed (as would Bacon's philosophy) by the Royal Society does not yet exist during the timespan I emphasise in my thesis (1626–1650). In the first half of the seventeenth century, Bacon's reforms of natural inquiry were not only epistemologically novel, but in the cases of Hartlib, Dury, and Boyle, were first shared amongst individuals who were, in fact, social, political, and national outsiders at that time. The environment of natural philosophy that would come in the wake and as a result of Bacon's – and Boyle's – works remained, up to the 1660s, in its formative stages.

In their books of both collaborative and individual research, Shapin and Schaffer do not place direct or concerted emphasis on Francis Bacon. Instead, their analyses extend from the designation of Robert Boyle as the definitive exemplar of natural philosophy of the seventeenth century. My thesis agrees with this designation. Shapin and Schaffer do concede that Bacon has at least played a notable role in the development of that philosophy. However, they claim, in particular, that the connection between Bacon and Boyle is tenuous and has been over-stated by historians.[238] They thus disallow any notable influence of the methodologically-deficient Bacon on the methodologically-pioneering work of Boyle.

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that the "Sociology of Scientific Knowledge" and Merton's "Sociology of Science" are not as discrepant from one another as proponents of either school would suggest, that in, fact that they both accept the same basic premises. Addressing both schools, Gieryn writes, "social and cultural factors are essential components in the construction of scientific knowledge. For a sociologist of science, this is a truism: if scientific knowledge could be analyzed as disembodied ideas floating in space and time but unattached to people, why is a sociology of science needed to complement idealist histories or philosophies of science?" Thomas F. Gieryn, "Relativist/Constructivist Programmes in the Sociology of Science: Redundance and Retreat," *Social Studies of Science* 12, no. 2 (May, 1982): 279-297, s282.

[237] Shapin, *ShoT*, 193.

[238] Steven Shapin and Simon Schaffer, *Leviathan*, especially 63, fn:85: "Although Boyle's inspiration may, plausibly, have been Baconian, the 'influence' of Bacon is sometimes exaggerated . . . It is useful to remember

Instead, we find that, at least from the late 1650s onward, Boyle's works are filled with references and expressions of gratitude to Bacon, even if his (Boyle's) writings during the beginnings of his experimental career in the 1640s are less-forthcoming regarding hard evidence of that influence. Importantly, Boyle's early, pre-experimental pursuits are marked by his literary concentration on ethical and moral issues. I find evidence that the young Boyle's initial attraction to Bacon's philosophy was stimulated by a moral, rather than a methodological ethos (though we will see that Boyle, to his death, will credit Bacon as a foremost methodological and epistemological influence). In this light, the thesis responds to historiographical assessments that desire, on one hand, to teleologically assess Boyle as a born experimentalist (due in large part, assert Shapin and Schaffer, to a determinism dictated by his status of a gentleman) and, on the other, to dismiss Bacon as a methodologist-manqué.

Graham Rees (1944-2009) has issued a worthy rejoinder against the latter tendency that helps us understand the nature of Boyle's attraction to Bacon. Rees defends Bacon against the historiography that chastises the latter's lack of achievement in an empirical and experimental milieu about which he (Bacon) would nonetheless seem to profess expertise. Rees returns his own charge against facile discourses which either, one, erroneously and irresponsibly brand Bacon the "father of modern science," or two, refute that brand, citing Bacon's deficiencies. I feel it appropriate to include Rees's invective here. It is an eloquent and incisive interjection which appears in the midst of Rees's own otherwise dispassionate scholarly analysis. The passage illuminates the contextual ethos of the thesis argument and aptly appears amongst the introductory material of Bacon's *Novum organum* in volume 11 of *The Oxford Francis Bacon*. Rees's sardonic subtitle for the section, "Francis Bacon: Great Instaurator," establishes the tone of what will follow:

> *Protopirum*, & vestigia nullius sequutum (a *Trailblazer* following in no man's footsteps) […] Bacon believed that he had made an original and momentous contribution to the advancement of the sciences and human welfare. On the whole this estimate was not shared by twentieth-century historians, philosophers, and critics, some of whom have evidently been impressed by a number of conventional charges which have cumulatively been laid at Bacon's door, charges whose egregious tenacity may destine them to be repeated until the crack of doom. In fact, I hesitate to mention them for fear of giving them renewed and undeserved vigour. But here goes: Bacon paid insufficient attention to Copernicus, Galileo, Kepler, and Harvey; he misunderstood or rejected many of the most important theories and discoveries of his day; he failed

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that it was Boyle, not Bacon, who developed the literary forms for an actual programme of systematic experimentation; it is hard to imagine two more different forms than Bacon's aphorisms and Boyle's experimental narratives." Cf., Rose-Mary Sargent, *The Diffident Naturalist*: *Robert Boyle and the Philosophy of Experiment* (Chicago: University of Chicago Press, 1995), 35: Sargent writes, "At the epistemological level, . . . where one seeks a justification for the foundation of science and for the subsequent theoretical results based upon such a foundation, Boyle showed a clear preference for the Baconian way of experience, It supplied, he believed, the best means for discovering truths about nature."

> utterly to understand the importance of mathematics in the emergence of the new sciences of the seventeenth century; his inductive 'method' was unworkable; and he had absolutely no discoveries whatever to his credit.
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> When they are not anachronistic junk, the counts in this dismal indictment are misleading or plain wrong. They spring from an outmoded historiography which persuaded its practitioners to search for 'founders' or 'fathers' of modern science – a drearily retrospective exercise if ever there was one. To qualify as a 'father' a philosopher had in some way to anticipate the physics of the late seventeenth century. A good candidate for a paternity suit would at least be a Copernican, a corpuscularian mechanist [Rees might refer to Robert Boyle here, a response to the claim by Shapin and Schaffer that Boyle could not have been influenced by Bacon], and a mathematizer of physical problems. Bacon (so the story went) was none of these, and so 'fathered' nothing; the measure of his sterility was his failure to resemble Newton […] [239]

Rees completes this passage with a reference to Bacon's emphasis on posterity that particularly resonates with the thesis: "Discovery (either in in its scientific or its technological aspect) could not, in Bacon's ambitious understanding of it, be the work of one man in one generation but of many in an indefinite number."[240] Bacon's concern that knowledge survive transmission beyond its own time is crucial to understanding his view on the role of the virtues as epistemological companions to the intellect. Bacon's natural inquirer can thus be any but an empirical tyrant. Not least, at the end of it, Bacon considers his philosophy to be the work of his methodological and epistemological contribution.[241]

In *Leviathan and the Air-Pump*, Shapin and Schaffer note that "Boyle's air-pump experiments have a canonical character in science texts, in science pedagogy, and in the academic discipline of the history of science."[242] We might thus surmise that Boyle, like his air-pump, inhabits a primarily mechanical, as opposed to philosophical or spiritual space in both diachronic and synchronic contexts of science history. In fact, the authors lay any non-scientific – or, rather, extra-scientific – impetus assigned to Boyle's chosen metier of experimental practitioner more readily at the deterministic door of his gentle social status than his psychological bents. Not much is given to the influence of Boyle's spiritual, or, in fact, pious, motivations for undertaking an "active life" in natural philosophy.[243] Correspondingly (as Rees's passage above has prepared us to encounter) they disallow that Boyle could have

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[239] Graham Rees, in Bacon, *NO*, xxxviii-xxxix.
[240] Bacon, *NO*, xxxviii-xxxix.
[241] See Francis Bacon, "*FRANCIS OF VERULAM THUS REASONING WITH HIMSELF* CONCLUDED THAT it would be in the interest of the living and of those yet to come to hear his words," Bacon, *NO*, 3.
[242] Shapin and Schaffer, *Leviathan*, 3.
[243] "Active life" refers to Bacon's departure from Aristotle in the realm of operative moral virtue. Happiness is not enough for Bacon; moral virtues must be fundamentally useful.

received substantial guidance from Bacon's philosophy since the latter left no mechanical, and very little in the way of an empirically methodological, legacy.[244]

However, the thesis finds that Boyle was moved to pursue natural philosophy not by any particular penchant for systematic exactitude and method, but instead, by the philosophical proviso that correct experimental practice is, prior to the methodological stage, a self-disciplinary matter of goodness and moral virtue. Arrival at this concept would have been epiphanic for a young Boyle. Bacon's philosophy, which hinges on the good and moral discipline of the experimental practitioner, was itself just entering its full flush of influence at the time of Boyle's entry into the experimental life in the mid-1640s, thanks in particular to the efforts of Samuel Hartlib, with whom Boyle would begin a regular correspondence no later than early 1647.

We remind ourselves that Bacon's intent throughout his works transcends the relatively pedestrian attempt to impart empirical methodology. Again, his view of the insufficiency of empiricism is matched only by his impatience with "dogmatists."[245] The error that Shapin and Schaffer make is that they contradistinguish between Boyle's narratives and Bacon's aphorisms based on their assumption that both Bacon and Boyle were seeking the path to empirical perfection. Conversely, we might better be served by a view which regards Boyle's narratives as studied responses to and emulations of Bacon's aphorisms. Thus, through his experimental narratives, Boyle endeavours to contribute his part to Bacon's aphoristic natural history. As far as experimental methodology is concerned in the 1640s, we find anything but examples of routine or standard practice. Boyle himself would be a pioneer in these contexts, especially after 1650.

The problems presented by a mode of analysis which places Bacon as failed empiricist recede when we free ourselves from the assumption that Bacon has attempted to construct an approach to empirical experiment according to the methods modern science would (as Rees addresses above) either very much like or refuse to attribute to him. Rather, the purpose of Bacon's work is to provide a guide by which the natural inquirer can engage in a chaste and fruitful interpretive relationship – a *marriage-song* – with nature.

Thus, Lisa Jardine's argument becomes problematic. In a context of analysis redolent of Shapin and Schaffer, Jardine defines natural inquiry as occupying a fundamentally collaborative and communitarian methodological context. She writes,

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[244] Boyle was particularly impressed by Bacon's posthumously published *Sylva sylvarum* (1627). Bacon's *Sylva* contains detailed descriptions both regarding modes of inquiry and of appropriate experiments. See Boyle's *A Proemial Essay* in Robert Boyle, *The Works of Robert Boyle, Volume 2*, ed. Michael Hunter and Edward B. Davis (London: Pickering and Chatto, 1999), 17. *A Proemial Essay* is discussed ahead in the thesis.
[245] Bacon, *NO*, 153.

> The scientist, like the artist, is one of us. He or she pursues scientific research along directions set by the interests and preoccupations of the community he or she belongs to. What keeps the scientist alert to the moral implications of his or her investigations is that sense of belonging, together with the fundamentally collaborative nature of the scientific project itself.[246]

Of first concern, Jardine would appear to describe the workings of a modern-day institute or laboratory well-stocked with known variables (I assert on behalf of my thesis that a community, by virtue of being a community, can only be interested in or become preoccupied with known variables). Such certitudes either did not exist for Bacon, or those that did were rife with errors and insufficiencies. However, of even greater concern, I believe that Bacon would be horrified to be presented with a natural inquirer whose moral/epistemological compass is calibrated according to his "sense of belonging." That concern for a sense of belonging, a sense of community, indicates a focus on the present, not on the future. Thus, the Baconian goals of charity and posterity in Jardine's paradigm are subordinate to belonging. In Bacon's paradigm, as we have seen, the inquirer who has given himself wholly to a marriage between mind and the universe has necessarily and wilfully given up belonging to anything but nature.

As in the case of Shapin and Schaffer, we note that Jardine's study, *Ingenious Pursuits*, from which the above quote originates, focuses on *late*-seventeenth-century scientific development in England. The "scientists" she describes in her image above are, like those working in post-Restoration England, working from a widespread and growing basis of known variables and methods which have already arrived via the literate experience and axioms of precedent inquiries. Therefore, we must again take the disparity between respective notions of new experiments and the substance of new knowledge in the years between 1605 (the publication year of *Bacon's Advancement of Learning*) and 1650, and those after 1660 into account. What constituted new knowledge in the later seventeenth century was far different than what could do so in the early seventeenth century. In Bacon's time (viz., the first two decades of the seventeenth century) inquirers could describe little about nature in what we, or even they, could call concrete scientific terms. Little had changed in this regard by the mid-1640s when Robert Boyle began his approach to experimental philosophy. By 1660, largely due to Bacon's guidance and Boyle's solitary work, the body of useful – and usable – knowledge had expanded.

Returning to Jardine's analysis, Bacon remains adamant that, in the pursuit of new knowledge, it is the collective, not the individual, that tends to enforce a so-called tyranny of

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[246] Lisa Jardine, *Ingenious Pursuits: Building the Scientific Revolution*, (London: Little, Brown and Company, 1999), 5.

method. As Jardine herself points out, scientific research in the collective theatre operates at the behest "of the interests and preoccupations [and, as Shapin would append, the *beliefs*] of the community he or she belongs to." Bacon responds *ex ante facto* to both historians:

> Nothing finds favour with the many unless it appeals to the imagination or ties the intellect up in the knots of common notions. Thus can *Phocion's* saying be very neatly transferred from moral to intellectual matters: *that men ought immediately to examine themselves to see how they have gone astray or been at fault if the multitude consent and give them an ovation*. This sign is then one of the worst.[247]

Bacon warns that collective consent, which is determined precisely by "the interests and preoccupations of the community," may, in fact, precipitate an insufficient methodology of experiment, not a success of epistemology. There are no "ovations" in the bride-chamber of mind and universe.

It is thus that I continue to reassesses Bacon's dubious reputation as the father of the collaborative scientific method. Thomas Kuhn reminds us that Bacon's writings, in fact, emphasise a greater urgency regarding the pursuit of new experiments than they do empirical precision. Kuhn notes that (solitary) practitioners such as William Gilbert (1544-1603), the work of whom Bacon greatly appreciated, and the Baconians Boyle and Robert Hooke (1635-1703), rather than "demonstrate what was already known or […] determine a detail required for the extension of existing theory [instead] wished to see how nature would behave under previously unobserved, often previously non-existent, circumstances."[248] For these individuals, the field of "previously unobserved and previously non-existent" natural behaviours was indeed vast.

We have seen that Bacon does anything but insist on empirical exactitude as a means to an end, even as he insists on sensory-intellectual discipline. In fact, he warns expressly against empiricism due to its deficiency in yielding the "light of experiments," that is, the potential for axiomatic progress from the "steady degrees" of experiment: "The empirics," he decries, "in the manner of the ant, only store up and use things" rather than produce new knowledge.[249] They produce no more useful works than scholastics or mechanics. Rather, Bacon seeks to correct a status quo wherein "the root cause of practically all the evils in the sciences is but one thing: that while we mistakenly admire and magnify the powers of the human mind, we fail to seek out true helps for it."[250] This is an appeal for patience, humility, and, above all, self-discipline. The object of "true helps" for the mind does not invoke

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[247] Bacon, *NO*, 123.
[248] Thomas Kuhn, *The Essential Tension: Selected Studies in Scientific Tradition and Change* (Chicago: University of Chicago Press, 1977), 43.
[249] Bacon, *NO*, 153.
[250] Bacon, *NO*, 67.

tyrannical authority of any sort. It instead suggests a return to the very primary-material root of sensory-intellectual – and, as such, moral – activity, which begins with the goodness in the human individual. The goal, again, is not empirical exactitude, but charity.

3.5 The Natural Inquirer's Commitment to Posterity

As we have touched upon earlier in the chapter (especially via Graham Rees's defence of Bacon), Bacon's ultimate epistemological goal of charity requires categorical deference to posterity on the part of the practitioner working in the amorphous milieu of the present. In "His Preface" to *De augmentis*, Bacon explains

> that this Our Instauration is a matter infinite, and beyond the power and compasse of Mortality; *seeing it is in truth the right and legitimate end and period of* Infinite Error; *and not unmindfull of Mortality, and Humane Condition, being it doth not promise that the* Designe *may be accomplished within the Revolution of an Age only, but delivers it over to Posterity to Perfect*.[251]

Since the advancement of knowledge provisioned by Bacon's Great Instauration must begin from scratch, there can be no deference on the part of individual inquirers to any source of authority in the *status quo*. If natural philosophy is to begin anew as Bacon says it must, we find ourselves at a loss as to what source of authority collective consent might originate. The collective in the present is at sea, awash in bereft sciences, beliefs, and preoccupations. The contribution from present inquiry to posterior benefit can only be made by the work of lone inquirers who have devoted themselves to a marriage with nature by the bonds of goodness and virtue. It is all but their duty to shut out the noise of bereft sciences. They must reinvigorate the existing Natural Histories with the literate and interpretive experiences of new experiments.[252]

Bacon insists that the results of natural inquiry must contribute a useful benefit to posteriority in the form of *experimenta fructifera* (fruit-bearing experiments) or *experimenta lucifera* (light-bearing experiments). That future generations receive the benefit from past works is central to Bacon's project of correction regarding the deficiency in what he terms the *Initiative* method of knowledge transmission. The *Initiative* method represents the *useful* counterpoint to Bacon's *Magistrall* method.[253] Bacon explains that the *Magistrall* method only "delivers popular *sciences* fit for learners, [while] the *other* [*Initiative*] *Sciences* as to the *sonnes of Science*. In summe, the [*Magistrall*] is referred to the use of *Sciences* as they now

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[251] Bacon, *OAPL*, 19-20.
[252] Bacon's Natural Histories are the collective repository of all extant knowledge. Literate and interpretive experience (*experientia literata* and *interpretatio naturae*) are the twin pillars of Bacon's Arts of Discovery. See Bacon, *OAPL*, 226.
[253] Bacon, *OAPL*, 272 ff.

are; the [*Initiative*] to their continuation, and further propagation."[254] Bacon describes a path of knowledge wherein the posterior success of inquiry is only realised insofar as it is given life through the works of future seekers, the sons of science. This in turn returns a solemn obligation of integrity and duty to the natural inquirers working in the present.

To Bacon, the common bonds which join the community together and which sustain the *status quo* are comprised of dead notions from the past which petrify as intransigent traditions of acceptable knowledge. In *De augmentis*, he lists what he calls "Peccant Humors in Learning," or, succinctly, "Errors".[255] The ninth of these errors "discovereth it selfe in the *manner of Tradition and Delivery of knowledge, which is, for the most part, imperious and magistral, not ingenious and faithfull*; *so contrived, as may command our assent, than stand to examination*."[256] Knowledge which has not stood to examination has thus not acquitted itself through the new inquiries of the sons of science. It has, instead, accepted and held an unearned status at the behest of collective assent.

Bacon is adamant that ventures of inquiry which promise only to confirm the received discourses of tradition are ultimately destructive to charity. Such useless endeavours must be supplanted by the dedicated labours of lone inquirers who have prepared themselves "to continually make [their] way, through the woods of Experience, and particular Natures, by the incertain Light of Sense."[257] We are correct again to understand that judgments of natural inquiry and the modes of experiment can only be usefully activated by committed individuals who have become intimate in their own way with nature. For Bacon, natural inquiry in its crucial initial stages is indeed an ascetic, not empiric, endeavour.

3.6 The Classes of Individual Goodness

We have seen that Francis Bacon's ontological view of reason, goodness and moral virtue extend beyond the conventional definitions and associations which pertain to spiritual and intellectual probity, personal integrity, trust and credibility amongst one's fellows. Instead, as I have discussed in Chapter 3, they signal a paradigm within the human psyche that corresponds to the fundamental processes of Bacon's matter theory. The moral virtues are the end result of a voluntary, deliberate endeavour on the part of the individual which begins with that individual's invocation of goodness from the inherent reason of the will. The reasonable will is analogous to Chaos, which contains the potential for material goodness. Goodness is

[254] Bacon, *OAPL*, 272.
[255] Bacon, *OAPL*, 35.
[256] Bacon, *OAPL*, 38-39.
[257] Bacon, *OAPL*, 14.

thus analogous to Cupidic primary matter. It is from this primary matter of goodness that the forms of the moral virtues are cultivated in the mind as adjuncts to the intellect by the individual. The highest virtue, charity, serves as Bacon's aegis for all endeavours of natural inquiry. Without this end object of "the good of Men and Mankind," knowledge and the labours of achieving it "[have] rather a sounding and vnworthie glorie. "[258] The creative appetitive process which begins with the labours of Individual or Self Good and proceeds to the Good of Communion represents, in Bacon's view, an essential preparatory undertaking for the natural inquirer who would commit himself to procuring new and useful knowledge.

As we have further discussed above, goodness is defined by Bacon according to its ultimate benefit to the human collective, or the Good of Communion. However, it must begin in the Individual or Self-good.[259] It is only from individual goodness that the moral virtues can extend as a definitively individual endeavour of husbandry. Bacon divides Individual, or "Private or Particular Good," into two general categories: "Good Active" and "Good Passive."[260] He contends that these properties are "found impress'd in the whole course of Nature [as] the two several Appetites of Creatures."[261] Individual Active and Passive Good themselves divide into three modes of appetites which govern all things in nature. Individual Passive Good comprises two: one, the appetite of a thing to "*preserv[e] or continu[e] it selfe* [or Conservative Good], and two, the appetite of a thing to *advance[e] and perfec[t] it selfe* [or Perfective Good]. "[262] Lastly, Individual Active Good comprises one appetite, that of a thing to *multipl[y] and exten[d] it selfe* [or Propagative Good] ."[263]

Bacon considers the Propagative Good, the "Appetite of Creatures [given to] multiplying and dilating themselves […] be the more powerful" in nature.[264] He observes that the "pleasure of Generation is greater, then that of Nutrition."[265] However, while the species of active Propagative Good may be the most powerful appetite in creatures, Bacon implies that it is not necessarily the most *useful*. Of the two remaining "passive" subcategories of Perfective and Conservative Good, Bacon asserts that "the *Perfective* excells; for it is lesse to conserve a thing in its naturall state, but greater to advance the same thing to a higher nature."[266] We might view the artificial husbandry of the primary matter of Individual goodness as the implementation of Bacon's *Perfective good.*

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[258] Bacon, *AL*, 7.
[259] Bacon, *OAPL*, 337.
[260] Bacon, *OAPL*, 342.
[261] Bacon, *OAPL*, 342.
[262] Bacon, *OAPL*, 344.
[263] Bacon, *OAPL*, 344
[264] Bacon, *OAPL*, 342.
[265] Bacon, *OAPL*, 342.
[266] Bacon, *OAPL*, 344.

Thus, the highest natural individual appetite after the imperative to propagate – which, as Bacon has noted, exceeds even the appetite for sustenance – is for perfection. The individual appetite for improvement is crucial in Bacon's scheme of natural inquiry. The impulse to improve and perfect necessarily invokes the consideration of posterity. For Bacon, all worthwhile and useful natural inquiry proves itself through its continuing yield of useful, charitable knowledge after the experiment and even after the lifetime of the experimenter. Not only the knowledge gained by an inquirer but the process by which he has come to that knowledge must travel beyond his own experience, beyond his own existence. Thus, we can define the perfective good as an individual's living appetitive deference to posterity. Here, the art of transmission becomes crucial.

Bacon grants profound epistemological status to the method and success of transmission regarding natural inquiry and the acquisition of new knowledge. He writes,

> Knowledge, which is delivered as a thread to bee spunne on, *ought to bee intimated* (if it were possible) *into the minde of another, in same method wherein it was at first invented*. And surely this may bee done in knowledge acquired by *Induction* . . . But yet certainly more or lesse a man may revisite his owne *Knowledge*, and measure over again the footsteps of his *Knowledge*, and of his consent; and by this meanes so to transplant *Science* into the mind of another, as it grew in his owne . . . So the *Delivery* of Knowledge, as it is now used, *doth present unto us faire Bodies indeed of Sciences, but without the Roots*; good, doubtless for the Carpenter, *but not for the planter*. But if you will have *Sciences* grow, you need not be so sollicitous for the *Bodies*; apply all your care that the *Roots* may be taken up sound, and entire, with some litle earth cleaving to them . . . and we will call it *Traditionem Lampadis, the Delivery of the Lampe, or the Method bequeathed to the sonnes of Sapience*.[267]

Here (as we re-encounter the *Traditionem Lampadis*) we see Bacon's emphasis not just on the qualitative substance of experimental records and their immediate efficacy, but on the survival of that knowledge to posterity. The natural inquirer, as an agent of knowledge acquisition, is thus also an agent of the future of knowledge, which serves Bacon's goal of the beneficence of Mankind.

The highest form of this beneficence is charity.[268] All of the attributes of Bacon's natural philosophy – the fruits and light of experiment, the utility of both mechanical and axiomatic products of inquiry, and the value of knowledge itself – are only proved by their success as charitable accomplishments. At the outset of *The Advancement of Learning* (1605), Bacon proceeds directly from the opening dedication to James I/VI to his defence of Charity as the ultimate end of useful knowledge:

> *Knowledge bloweth up, but Charitie buildeth up . . . If I spake . . . with the tongues of men and Angels, and had not Charitie, it were but as a tinckling Cymball*; not but that it

[267] Bacon, *OAPL*, 272-273.
[268] See Bacon, *AL*, 7; Bacon, OAPL, 361.

> is an excellent thinge to speake with the tongues of Men and Angels, but because if it bee seuered from Charitie, and not referred to the good of Men and Mankind, it hath rather a sounding and vnworthie glorie, than a meriting and substantiall vertue.[269]

Eighteen years later, in *De dignitate et augmentis scientiarum* (1623), Bacon explains that "true religion and the Holy Christian Faith, laies hold on the substance it selfe, imprinting upon mens Minds *Charity*, which is most properly called, *The bond of perfection*, because it comprehends and fastens all virtues together."[270] We may interpret Bacon's invocation of this language as his reasoning that all human endeavours are only as worthy as the benefit they bring to the ages that follow them. The efforts of men in the present are thus to be undertaken on behalf of posterity.[271] The challenge to the inquirer is to engage in the arduous task of natural inquiry with the knowledge that it is all but certain that he will not live to see the fruits – and light – of his work.

How is this task to be accomplished? Bacon reasons that the inquirer's focus on charity (that is, on the bond of perfection which comprehends and fastens all virtues together), and thus on posterity, implies that natural inquiry and the advancement of knowledge must be both endeavours and products of individual goodness in human beings. The moral virtues he cultivates from that goodness become its behavioural agents in his mind and body.

Bacon explains at the outset of the Seventh Book of *De augmentis* (1623) that "*Right Reason governs the will, Good Apparent seduceth it; the Incentives of the will are the Affections, the Organs and voluntary Motions, are hir Ministers*."[272] This scheme of reason, goodness, and moral virtue withstands analysis in terms of Bacon's matter theory. In particular, the integrally related properties of cause and appetite reveal individual goodness to be possessed of the appetitive principles of material motion and moral virtues to represent forms of that original goodness.

The *Oxford English Dictionary* provides a useful phrasal reference under the entry of *virtue* which illuminates the appetitive context of the term as it is used by this study.[273] The exemplary phrase is taken, by coincidence, from *Philosophical Transactions*, the journal of the Royal Society, whose mission was votively Baconian.[274] It reads, "Yet have these two Load stones no connexion or tye, though a *Common Center of Virtue* according to which they

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[269] Bacon, *AL*, 7.
[270] Bacon, *OAPL*, 361.
[271] See Bacon, *OAPL*, 19-20.
[272] Bacon, *OAPL*, 333.
[273] *OED*, "virtue, n.," accessed April 2, 2022, heading [II.8.c.], https://www.oed.com/view/Entry/223835?rskey=JHDNnV&result=1#eid.
[274] Thomas Sprat, *History of the Royal Society*, eds. Jackson I. Cope and Harold Whitmore Jones (London: Routledge & Keegan Paul Ltd, 1959), *passim*.

jointly act."[275] This excerpt illustrates that *virtue* so defined refers to an active and appetitive *material cause* that is present not only in sentient biological beings, but in all *things*. It describes an active, causal force inherent in nature. The virtuous attraction of the loadstone as an appetitive motional property.

Bacon himself invokes the example of loadstone magnetism as symbols of the Good of Communion in the Seventh Book of *De augmentis*. He writes, "*Iron* in a particular Sympathie moves to the *Loadstone*, but yet if it exceed a certaine Quantitie, it forsakes those affections, and like a good Citizen & a true Patriot moves to the Earth, which is the Region and Country of its connaturals."[276]

The principle of *cause* (viz., the impetus by which the loadstones "jointly act") receives great emphasis in Bacon's matter theory. Cause supplies the evidence of appetitive material principles even in the absence of substantive physical properties. Bacon places more emphasis on cause as a means to assess natural properties than physical characteristics, a point we will examine further with Stephen Gaukroger's analysis of Bacon's matter theory. Gaukroger clarifies Bacon's view that cause and the active motion which it generates serve as means to assess and qualify material principles in things which defy other modes of observational analyses. Bacon considers the mere featural description of things to be insufficient in that such "dead" descriptions offer nothing in the way of useful information as to the appetitive behaviours of those things.

We may describe Cupidic primary goodness in terms of its causal material motion. Human individual goodness supplies the operative moral virtues which moderate the intellect and the sense (mind and body) in the execution of natural inquiry. The active material of goodness must be cultivated, shadowed forth in Cupidic primary matter, by means of an individual's conscious and deliberate human *art*.[277] The positive and preservative power of active goodness in individual human beings is not inherent as it is in Nature. It requires an ongoing process of husbandry on the part of the inquirer. The husbandry of goodness and moral virtue absorb the weakness and suggestibility of the human interpretive instrument and allow for the best use for the sense and intellect.

Individual goodness aligns one's sensory and intellectual powers with the powers of nature itself. Nature is inherently possessed of goodness, that is, of the appetitive deference to posterity, which transforms her own destructive tendencies into ultimately creative forces.

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[275] *OED*, "virtue, n.," accessed April 2, 2022, heading [II.8.c.], https://www.oed.com/view/Entry/223835?rskey=JHDNnV&result=1#eid.
[276] Bacon, *OAPL*, 337.
[277] Bacon, *DPAO*, 199.

Bacon requires that the inquirer view himself as a fellow-in-creation to nature rather than entertain the delusion that he is a fellow to the Creator. Goodness enables intrinsic and unique potential to devote his divine gift of reason and intellect to the generation of beneficial works in nature, that is, in the created world. For Bacon, goodness is a human, not divine, creation. Though a human artificial creation, it is the same *material* as the appetitive positive power inherent in matter and nature. Bacon observes that

> when *Nature* makes a Flower or *Living Creature*, she engenders and brings forth rudiments of all the parts at one time. So in obtaining virtues by *habite*, while a man practiseth *Temperance*, he doth not profit much to *Fortitude* and the like; but when we wholly dedicate and devote our selves to good and honest ends, look what virtue soever *such ends* commends and commands our minds unto, we shall find our selves invested and predisposed with a kind of hability and propension to pursue and expresse the same.[278]

In Bacon's scheme, goodness thus corresponds to "matter itself, its power and nature, and in fine the principles of things [which] had been shadowed forth in *Cupid* himself."[279] As matter is shadowed forth in Cupid from the darkness of Chaos and thus becomes appetitively virtuous, the human individual shadows forth the appetitively virtuous goodness from the unclaimed reason of their will.[280] The relationship between Cupidic matter and the human material of goodness is non-metaphorical.

Chaos, the night in which the egg of Cupid, the symbol of matter, incubates until it hatches, corresponds to the human Will.[281] Bacon also refers to Cupid as "the most ancient of all the gods and therefore older than all things except Chaos."[282] "Chaos," Bacon contends, "signifie[s] the uncreated mass or congregation of matter."[283] However, it contains the potential for Cupidic primary matter as the human Will contains the potential for the primary passionate material of individual goodness. Individual goodness, the primary matter "shadowed forth in the [individual] himself," is cultivated by the individual human being from the inherent reason of the Will. Thus, we may consider Chaos to be analogous to the

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[278] Bacon, *OAPL*, 360.
[279] Bacon, *DPAO*, 199.
[280] For Bacon's theory on the origins of matter, see *On Principles and Origins According to the Fables of Cupid and Coelum . . .*, Bacon, *DPAO*, 197 ff.
[281] Bacon, *DPAO*, 197 ff.
[282] Bacon, *DPAO*, 197. Bacon would seem to invoke Plato and Hesiod, viz., for example, the former's *Symposium 178b*: "Of the most venerable are the honours of this god [Cupid, or Love], and the proof of it is this: parents of Love there are none, nor are any recorded in either prose or verse. Hesiod says that Chaos came first into being – and thereafter rose Broad-breasted Earth, sure seat of all for aye, And Love. Acusilaus also agrees with Hesiod, saying that after Chaos were born these two, Earth and Love. Parmenides says of Birth that she "invented Love before all other gods." Plato, *Symposium*, 178b, in Perseus Digital Library, Gregory R. Crane, Editor in Chief, Tufts University. https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0174%3Atext%3DSym.%3Asection%3D178b.
[283] Bacon, *DPAO*, 199.

reason of the will and goodness to be the Cupidic primary matter which serves as the source of the appetitive human power to interpret nature as an act of deference to posterity and to the benefit of the human collective whole, or, in Bacon's terms, the Good of Communion.[284]

Bacon has explained that Chaos "signifies the uncreated mass or congregation of matter."[285] So the Will signifies the uncreated mass of the human soul and mind. The material of one's individual, or primary, goodness is incubated in the reasonable will in the same manner as Cupidic matter is incubated in Chaos. However, in the case of individual goodness, each individual human being must *act* as his own Cupidic creative agent on behalf of posterity and Charity.

Thus, I argue against the claim that the goodness and moral behaviour which benefit the whole of humanity are products of the communitarian civil theatre. Goodness enters the natural world when it is shadowed forth from the reasonable will on an individual basis. Only once that original creative act has succeeded can the appetitive power of Individual goodness proceed to the Good of Communion. As such, Bacon does hold that the moral virtues have properties which form in accordance with the individual and collective spheres of humanity. However, the thesis contends that individual goodness and the moral virtues which extend from it provide the integrity of the individual human sensory-intellectual experience in the realm of natural inquiry. The collective, or what Bacon denotes as "man congregate," is epistemologically unsuited to this realm.

3.7 "man segregate" and "man congregate"[286]

Bacon asserts that "[t]here is imbred and imprinted in every thing an appetite to a *duple Nature of Good: the One as everything is a Totall or Substantive in it selfe [the Self-good]; the other as it is a part or membre of some greater Totall* [the Good of Communion]."[287] Of *Self-good* ("total or substantive in itself") and the *Good of Communion* ("a part or member of a greater body"), he provides that the latter "is in degree the greater and the worthier because it tends to the conservation of a more general form."[288] That Bacon designates The Good of Communion as "the worthier" may perhaps explain the historiographical misapprehension that Bacon dismisses the individual good on behalf of the collective good in the context of natural inquiry and practical epistemology.

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[284] Bacon, *DPAO*, 199; Bacon, *OAPL*, 337.
[285] Bacon, *DPAO*, 199.
[286] See Bacon, *OAPL*, 218.
[287] Bacon, *OAPL*, 337.
[288] Bacon, *OAPL*, 337.

The Good of Communion, unlike the Individual Good, does not function by appetitive material principles. If anything, the Good of Communion is itself, in effect, the object of the appetitive behaviour of the Self-good. Indeed, the end of *all* good is, for Bacon, charity and the beneficence to the entire collective of humanity. However, what separates the Good of Communion from the Individual Good is that the former does not have an efficient cause. Bacon asserts that the Christian faith itself is built upon the idea that the collective good is constructed from the morally sound Self-good of each respective individual: God has created only morally capable individual human beings, not societies. The collective potential of those individuals to obey Christian law is, in fact, a political project that obtains not just in the world of men, but in the entire realm of second causes. Bacon notes,

> [t]here was never extant in any age of the world, either Philosophy, or Sect, or Religion, or Law, or Discipline, which hath so highly exalted the *Good of Communion* and depress'd *Good private and particulare*, as the *Holy Christian Faith*, whereby it cleerely appears, that it was one and the same *God* that gave the Christian Law to Men, who gave those Lawes of Nature to Creatures of inferior order.[289]

However, the Good of Communion, which indeed evokes the influence of Christian laws and the beneficence of humanity, should not be confused or treated in conjunction with collective political behaviour. Bacon warns against the pitfalls and dangers inherent in the mis-association of civil life with the Good of Communion, which is, at its root and so at its branches, an exercise of individual appetitive goodness. However, the success of the civil realm veritably requires that the behaviour stemming from individual goodness and moral virtue be kept in reserve.

Ian Box directs us into the midst of what Bacon regards as a human political reality wherein the successful conduct of human society occurs at the expense of individual morality.[290] Man is, at once, naturally equipped with the potential for his own individual goodness, but is also beholden to a duty to preserve the communitarian bonds of human society; the individual is necessarily a participant in political, communitarian environment. These two modes of existence, as Bacon notes, are often not compatible. Individual goodness is the primary material in Man that emulates the goodness in nature and thus allows the inquirer to discover nature's secrets. In the political sphere of humanity, individual goodness is as prone to defilement and destruction as the goodness in nature. Where individual goodness defers to posterity, the political realm of Man is dedicated to preserving the status

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[289] Bacon, *OAPL*, 338.
[290] Ian Box, "Bacon's Moral Philosophy," in *The Cambridge Companion to Bacon*, ed. Markku Peltonen (Cambridge: Cambridge University Press, 1996), 260-282.

quo. The respective projects require, quite literally, different materials, and the latter is lethal to the former.

> Bacon explains that not only
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> > is there . . . a *Habit* of *Goodnesse*, directed by right Reason; but there is, in some Men, even in Nature, a Disposition towards it: As on the other side, there is a Naturall Malignitie. For there be, that in their Nature, doe not affect the Good of Others . . . Such Men, in other mens Calamities, are, as it were, in season, and are ever on the loading Part; Not so good as the Dogs, that licked *Lazarus* Sores; but like Flies, that are still buzzing upon any Thing that is raw; *Misanthropi*, that make it their Practise, to bring Men, to the Bough . . . Such Dispositions, are the very Errours of Humane Nature: And yet they are the fittest Timber, to make great Politiques of: Like to knee Timber, that is good for Ships, that are ordained, to be tossed; But not for Building houses, that shall stand firme.[291]

Box quotes the last line of this passage ("the fittest timber to make politiques of") as a means to illustrate Bacon's assertion that (as Box writes), "political life requires qualities that are often at odds with conventional Christian [i.e., Individual] morality."[292] Box finds that Bacon has divided knowledge between "those sciences such as medicine, logic, and ethics which consider man 'segregate' and civil philosophy which treat individuals 'congregate and in society'."[293] I accept both of these assessments. However, Box then declares "this distinction problematic," and asks, "How can moral conduct be examined outside a social context?"[294]

It is illuminating in light of Box's analysis, to return to the year 1612, and in particular to Bacon's essay published that year, "Of Goodnesse, and Goodnesse of Nature." As a prelude to analysis, we observe the biographical and publishing history of the volume in which this essay appears. 1612 saw the updated publication of Bacon's original collection entitled *The Essayes or Counsels, Civill and Morall*. First published in 1597 and containing ten essays, the collection was revised thirteen times between 1597 and 1625.[295] Bacon added twenty-nine new essays to the original ten in 1612 and nineteen more in 1625 (the year before his death). There are a total of fifty-eight essays in the complete and final 1625 volume.

The years of respective publication are particularly significant to the thesis. As we will see, Box's analysis temporally conflates the thematic thrusts of Bacon's writings. This tendency risks misleading analysis. While the substance of Bacon's philosophy remains remarkably and soundly consistent through his life, nonetheless we must heed evidence that

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[291] Bacon, *Ess*, 40.
[292] Box, "Bacon's Moral Philosophy," 266.
[293] Box, "Bacon's Moral Philosophy," 264. For more on Bacon and the influence of medicine on his epistemology, see Ian Box, "Medicine and Medical Imagery in Bacon's Great Instauration," in *Historical Reflections/Réflexions Historiques* 16, no.2/3 (Summer & Fall 1989): 351-365. http://www.jstor.org/stable/41298926.
[294] Box, "Bacon's Moral Philosophy," 264.
[295] For all of the publishing information of *The Essayes*, see Bacon, *Ess*, cxvi-cxviii.

his priorities in 1597 and 1612 were far more weighted toward the workings and civil uses of socio-political behaviour than his works after 1620. The earlier essays are in large part dedicated to the advice for political and civil manoeuvring, while the 1625 essays pertain to issues of moral behaviour and personal pursuits. Thus, it aids my analysis to note that Bacon's essay "Of Goodnesse," written in 1612, has for its author a lawyer and Member of Parliament who, having been knighted in 1603 on James I/VI's ascent to the English throne, would only continue his ambitious political ascent until he was made Lord Chancellor six years later in 1618. He would be created Francis, Lord Verulam that same year, and Viscount St. Alban in 1621. By the end of 1621, however, we find Bacon has fallen from grace as precipitously as one might without suffering execution. In "Of Goodnesse" Bacon writes,

> I take Goodnesse in this sense, the affecting of the Weale of men, which is that the Grecians call *Philanthropia* . . . Goodnesse I call the Habit, and *Goodnesse of Nature* the Inclination. This of all Vertues and Dignities of the Minde, is the greatest; being the Character of the Deitie: And without it Man is a Busie, Mischievous, Wretched Thing; No better than a Kinde of Vermine. *Goodnesse* answers to the *Theological Vertue Charitie*, and admits no Excesse, but Errour.[296]

These lines could very well serve to preface many of Bacon's post-1620 themes which run through and define the corpus of his *Instauratio magna*. However, in 1612, Bacon reveals that his epistemological perspective on moral virtue is still in development. Box endeavours in his chapter to provide "support for the view that in the *Essays* Bacon examined private morality from a civil perspective."[297] If this is the case, then we must treat that "private morality" as a facet of the civil sphere, not of the distinctly separate human realm of *individual* morality, which is a facet of original appetitive primary goodness.

Box inadvertently illuminates this proviso as he makes note of the essay, "Of Love," another one of Bacon's addenda to *The Essays* in 1612. Box summarises Bacon's warning thus: "if vice can be used in public life, it is also true that virtue can be dangerous."[298] This would serve not only to reinforce Bacon's contention that the worst human errors may serve "as the fittest timber" in the political theatre, but that individual moral virtue can actually cause damage if applied in public life.

Box continues his discussion of vice being used for positive ends in public life: "This theme is developed in the essay 'Of Love' where no mention is made of the description of charity in the *De augmentis* as 'the bond of perfection'. Instead, we read that 'it is impossible to love and to be wise' and 'that great spirits and great business so keep out of this weak

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[296] Bacon, *Ess*, 38-39.
[297] Box, "Bacon's Moral Philosophy," 267.
[298] Box, "Bacon's Moral Philosophy," 266.

passion.'" [299] This quote illuminates the necessary proviso which we must affix to Box's assertion that "Bacon examined private morality from a civil perspective." Indeed, civil morality (or civil knowledge, as Bacon calls it) is the theme in the *Essays*, but the private morality pertains to the behaviour of individual persons insofar as they are actors in that civil and political sphere. This a far different species than the individual engaged in Baconian natural philosophy. What is missing from the civil theatre is the influence of individual appetitive good, which, as Bacon indeed suggests, must be either suppressed in or hidden from political life. Charity and posterity, as motives and ends, do not figure into the workings of the collective civil theatre.

In his later works, Bacon provides no "private" or "civil" aspect of natural inquiry other than as it may enable the transmission of beneficence from useful works (the proper dissemination of gathered knowledge indeed requires cooperation and collaboration). Bacon distinguishes between the qualities that are appropriate for social and political functions and those for individual inquiry. In the former case, the fundamental purpose of moral behaviour is to achieve the best result possible in the world of the collective, of the community. That best result is the success of the community. In the latter case, the purpose of moral virtue is to enable the knowledge of natural truths, which, in the communitarian realm, might cause discord and disagreement.

Bacon starkly divides civil and moral behaviour as if separate species in *De augmentis*. Again, we note that *De augmentis* is published in 1623, two years after Bacon's exit from civil and political professional life. He writes,

> Civil science is conversant about a subject which of all others is most immers'd in matter, and therefore very difficultly reduced unto *Axioms*: yet there many circumstances which help this difficultie: for first, as *Cato* the Censor was wont to say of his Romans, That they were like Sheepe, a man were better drive a flock of them, than one of them; for in a Flock, if you could but get some few to goe right, you would hav all the rest follow of their own accord. *So in this respect indeed, the Dutie of Moralitie is somewhat more difficult than that of Policy. Secondly Moralitie propounds to itself that the Minde be imbued and furnisht with Internal Goodness; but Civile knowledge requires no more, but Goodnesse externall only, for that suffices for society.*[300]

Bacon argues that civil knowledge is defined by its labours of persuasion, diplomacy, and even varying shades of cynicism and tyranny. He expressly divides civil knowledge "*into the* Knowledge *of Conversation; the* Knowledge *of Negotiation*: *and the* Knowledge *of Empire, or of State Government*."[301] There is no mention of charity or beneficence in these divisions.

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[299] Box, "Bacon's Moral Philosophy," 266.
[300] Bacon, *OAPL*, 366. Emphasis mine.
[301] Bacon, *OAPL*, 365.

The behaviour is externally based and concerned only with the exigencies of the status quo (not posterity), as it does not proceed from a source of individual goodness. The practitioner of the civil arts, even if he has successfully husbanded his individual moral virtue, must be prepared to relinquish the same in order to either appease, combat, or exploit one fellow on behalf of another. It is for this precise reason that the Baconian inquirer of natural philosophy must remove himself from the jurisdiction of communitarian assent and consent, from the hazards of a good that is only external, in order to properly engage the interpretation of nature. As Bacon implies, the natural forces of both Earth and cosmos are naturally active and positive and thus render the issue of moral virtue in nature manifestly mute. Nature has no need for such correction because it is not susceptible to the obstructive hazards of the Intellect or of the collective. Man must artificially create within himself an internal moral virtue not subject to an external endeavour toward justice and probity in the greater human world. Only this internal moral virtue, kept chaste and clear of political manoeuvring, can hope to correspond to the forces in nature.

Bacon implies that the Good of Communion can indeed exist separately without direct intervention of the Self-good. The individual Self-good may have a mind to the Good of Communion, but that latter Good cannot influence the former. Bacon goes so far as to warn that individual moral virtue may actually impede the achievement of propitious outcomes in the socio-political realm of men. The object of the Good of Communion in practice exists in the external functions of society, which involve the political doings of men, not the chaste forces of nature. If Self-Good is as Self-Good does, then the Good of Communion is as the members of the polity do.

Such moral flexibility is not tenable in the realm of the Self-good. There is no civil negotiation in that paradigm, only the alignment of individual goodness and moral virtue with the active forces of nature. In the inevitable suspension of individual moral sensibility which must occur in political and civil milieux, an end of collective beneficence may be sought through civil negotiation, but the substance of that beneficence is much different than that extending from the roots of individual goodness. As Bacon has pointed out, what suits the community may not suit the individual, thought that individual must abide the community. In the social theatre, compromise in this situation is not only possible, but necessary.

However, compromise is categorically difficult in the theatre of individual goodness and moral virtue, especially when the interpretation of natural truths is at stake. In one's communitarian dealings, a person can "leave," so to speak, their individual moral virtue at the door. As they labour without it among men, they nonetheless know it is there and that they can retrieve it when they leave the chamber of civil combat. This paradigm does not and

cannot work in the province of natural inquiry. In that case, a person must not only take their moral virtue through the door and into the chamber of inquiry, they must live by its discipline throughout the entire course of their inquiry. The degree of adherence to moral virtue required for the proper human conduct in natural inquiry precludes any distraction by or deference to a communitarian aegis. It is virtually an exercise in asceticism and Bacon presents it as such.

Regarding Box's argument, analysis must differentiate between Bacon the public and political-minded advisor, and Bacon the natural philosopher given to the solemn human endeavour of acquiring useful knowledge. Bacon's earlier essays, especially those from 1597 are weighted toward the vicissitudes of civil existence. This does not, in the context of the thesis argument, disqualify those essays' validity or usefulness. However, it is conceptually untenable to import the strategy and tactic which must be brought to bear in the political arena into the ascetic realm of natural inquiry. We have seen and will see Bacon identify this error as having gained an epistemologically obstructive foothold in the advancement of human learning.

It is noteworthy that the balance of Bacon's writings regarding the moral endeavour of natural inquiry begin in earnest when his civil life is on the wane. By 1620, even before his impeachment, the political aspects of Bacon's philosophy have been subsumed by the rigours of methodological and epistemological integrity. In the years between 1597 and 1620, Bacon had developed a thematic mistrust of the human community as the seat of authority in natural inquiry, even as he further honed his conviction that the ultimate fruit of natural inquiry is the improvement of Man's estate. As a matter of retrospective coincidence, the year 1621 saw his impeachment, his brief imprisonment in the Tower of London, and his exit from civil and political life, Bacon had become convinced, as is evident in his later writings, that Man, plagued by his Idols, is his own worst enemy in the endeavour to improve his own lot. Bacon would assert that the task of improvement must be remanded to the respective powers of potential in the material of the human animal and in the material of nature, both of which Man must consciously cultivate. For human beings, that potential is contained in goodness and represented by moral virtue. For nature, which has no Idol-ridden intellect to be subdued, it is represented by her own active and positive power. All descend from the common origins of Cupidic appetitive matter.

Removed from public life in 1621, Bacon himself assumed his own ideal of the natural inquirer freed from the vain and disputatious clatter of the political theatre.[302] As Box

[302] Eric H. Ash includes a detailed account of Bacon's demanding participation as attorney general with controversies surrounding the commission of sewers amongst the vicissitudes of Fens engineering projects in

has shown, the communitarian forum, *especially* the political theatre, is precisely designed to accommodate vanity, disputation, and persuasion. Should a political individual (as Bacon had been) desire to engage in natural inquiry, he would be forced to leave that externally-focused forum behind while he engaged the individual work of the interpretation of nature.

In 1620, Bacon abnegated his civil life on behalf of his own project. He saw his greatest strength in his dedication to creating the instructive literature of the *Instauratio magna* in lieu of undertaking any extensive experiments (which he did on a limited scale). Now ensconced in his "solitary undertaking," those of Bacon's writings which do address political contexts are transmitted from a context of active Self-good and an individual (that is, *internal*) morality.[303] From Bacon's new station after 1620, we may, for comparison's sake, revisit his political advices of 1597 as given in his essay "Of Followers and Friends." In 1597, he writes that "to speak Truth, in Base Times, Active Men are of more use than Vertuous."[304] However, by 1620, Bacon's ideas of both "action" and "use" have altered significantly.

Thus, Box confuses Bacon's paradigms. The former writes, "The argument does not suggest that morality must be sacrificed in the name of advancement in life; instead, it develops the claim made in the Instauration that public life has a higher value than private life."[305] However, as we have noted, Bacon conveys that civil knowledge, which requires only an external goodness, is sufficient for public life. There is no demand made upon the internal, individual goodness of communitarian participants in order to make the community succeed. For this reason, in Bacon's view, both civil knowledge and the Good of Communion are ill-suited to the guidance of the human sensorium in the interpretation of nature.

In the Seventh Book of *De augmentis*, Bacon, having asserted the superior worthiness of the active civil life over the contemplative private life, now focuses on the Individual, or Self-good. We have seen him subdivide the Individual good into Good Active and Good Passive. It is here that we are shown into the theatre of individual moral motivation for the conduct of natural inquiry. While the Good of Communion is the goal of inquiry, the Individual active good mediates the actual initiation and methodological practice of the inquirer. Bacon requires that for the results of inquiry to be of useful value, the means by which those results are found must be a chaste enterprise. Only the individual can be chaste.

1616. Eric H. Ash, *The Draining of the Fens: Projectors, Popular Politics, and State Building in Early Modern England* (Baltimore: The Johns Hopkins University Press, 2004), 102-103.

[303] Bacon, *NO*, 5. Referring to the project of the *Instauratio magna*, Bacon conveys to his readers: "Nor did he fail to see that this experiment of his might be a solitary undertaking, and how desperately difficult it may be to get others to put their trust in it."

[304] Bacon, *Ess*, 148-149.

[305] Box, "Bacon's Moral Philosophy," 268.

Bacon holds that Individual Good "is found impress'd in the whole course of Nature: but chiefly discloseth it selfe in the two several Appetites of Creatures; the one of *Conserving and fortifying* themselves; the other of *multiplying and dilating* themselves."[306] These two appetites are Good Passive and Good Active, which Bacon also respectively identifies by their Roman terms "Condus" (the weaker conservative Individual Good) and "Promus" (the stronger multiplicative Individual Good).[307] For Bacon, the endeavour of natural inquiry belongs to Promus, the Active Individual Good. Inquiry is, in fact, an act of propagation. It belongs to the same active instinct which drives individual human beings to multiply and transmit their contributions to posterity. Graham Rees clarifies, "Discovery (either in its scientific or its technological aspect) could not, in Bacon's ambitious understanding of it, be the work of one man in one generation but of many in an indefinite number."[308]

Rees argues that Baconian natural inquiry and the interpretation of nature are to be carried out with the same sense of mission by the inquirer as his own consanguineous propagation. According to Bacon, Man's motivation to participate in a pure, morally sound programme of natural inquiry is rooted in the unrelenting awareness of his own impermanence. Bacon writes that the "preheminence of the *Active Good*, is infinitely exalted from the consideration of our humane condition, that it is mortal, and also exposed to the stroak of fortune."[309] Only by way of individual goodness and the subsequent works of the moral virtues can human beings attend the responsibility of correctly interpreting nature with the humility and unrewarded sedulousness with which a parent raises a child. Bacon continues, beginning with a citation from Proverbs and ending with a quote from Revelations,

> *Magni estimamus mori tardius; Et ne glorieris de crastino, nescis partum Diei:* it is no wonder if with all contention of spirit, we pursue those things, which are secur'd and exempt from the injuries and affronts of time: and these things can be nothing else but only our *deeds*, as it is said, *opera eorum sequuntur eos*.[310]

If Bacon has invoked the concept of "duty" in his discussion of the obligations of men to engage in often cynical civil behaviours as a necessary reality in maintaining the collective status quo, he also invokes duty within the context of the Individual Good. It is the duty of the natural inquirer to engage in the endeavour to understand nature under the aegis of his individual goodness. Individual primary goodness is the only force, like that in nature, by which one can constructively employ the positive, active, and materially appetitive powers of

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[306] Bacon, *OAPL*, 342.
[307] Bacon, *OAPL*, 342.
[308] Graham Rees, in *NO*, xxxix.
[309] Bacon, *OAPL*, 342.
[310] Bacon, *OAPL*, 343. "We greatly esteem a slow death: And take no pride in the toast, you know nothing of tomorrow [and] their works follow them." Translation mine.

his senses, his intellect, his goodness, and his moral virtues. Only through his Cupidic invocation of individual goodness can one know nature, which is unplagued by the intellectual lusts and weaknesses that afflict the collective. Thus, only through the fulfilment of individual goodness, strengthened by the forms of moral virtues, can a human being contribute to the Good of Communion.

Bacon illuminates the original and fundamental methodological and epistemological role of individual appetitive goodness in the acquisition of useful knowledge in the image of the honey-bee (previously discussed). Perhaps more than any other creature in the human history of metaphor, the bee embodies communitarian duty and collaborative endeavour. Bacon writes,

> Those who have dealt with the sciences have either been empirics or dogmatists. The empirics, in the manner of the ant, only store up and use things; the rationalists, in the manner of spiders, spin webs from their own entrails; but the bee takes the middle path: it collects its material from the flowers of field and garden, but its special gift is to convert and digest it. The true job of philosophy is not much different, for it depends not only or mainly on the powers of the mind, nor does it take the material gathered from natural history and mechanical experiments and store it unaltered in the memory but lays it up in the intellect changed and elaborated.[311]

In Bacon's idyll, the bee is shown, first, as a practitioner whose work, though it may mirror the work of countless others engaged in precisely the same labour, is a definitively individual enterprise. The end-product, the universally beneficial honey (i.e., the Good of Communion), is only obtainable through the original, disciplined, and solitary labours of each individual worker. This includes not just the activity of gathering the pollen, but, as importantly, the work of the individual's intellect in converting and digesting the original material. That original work cannot be done by the community. The Good of Communion can only be achieved through the original dedication to the Individual good. Again, we note that bees, as non-human creations in nature, are not susceptible to the distracting and destructive forces of the human intellect and so do not require a regimen of individual and causal moral virtue. Human beings, conversely, cannot embark on beneficent individual labour until they have succeeded in the regimen of cultivating their individual goodness. Thus, the community relies on the sanctity of individual inquiry so that it might be supplied with useful knowledge in the same way that the hive relies on the individual bee to be supplied with the digested and otherwise useless material of pollen.

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[311] Bacon, *NO*, 153.

3.8 Conclusion

I conclude this chapter with a stark delineation on Bacon's part between Individual Good and the Good of Communion as they would respectively benefit and compromise the business of natural inquiry. It is primary individual goodness which enables Man to labour on behalf of posterity and the Good of Communion. This operation is in full accordance with Bacon's theory of matter. The Good of Communion is the appetitive effect of primary, causal, and appetitive Individual Good. The acquisition of knowledge must be carried out by individuals who have dedicated themselves to the self-discipline of harnessing primary goodness, for this is the source of the Good of Communion.

In describing the errors of men and philosophy which inspired him to undertake the *Instauratio magna*, Bacon complains that "philosophy is run exactly as if it were some kingdom or state which in its deliberations and business relied on town chatter and gutter gossip instead of the correspondence and reports of trustworthy ambassadors and emissaries."[312] The individual must disencumber himself from the wiles of the civil theatre so that he may acquire useful knowledge. We note in this passage that Bacon condemns the notion that philosophy be subject to the questionable trust and authority of consent – "town chatter and gutter gossip" – in the civil community of men. Bacon provides that the trust of natural interpretation is to be found in the correspondence and reports, that is, in the literature, of "trustworthy ambassadors," that is, self-disciplined individual natural inquirers. In this latter paradigm, trust is determined not by belief or collective consensus, and not even by the moral integrity of those who have undertaken such an important task as the transformation of wild and raw material into useful and beneficent human knowledge. The path of trust begins with the individual cultivation of one's primary goodness and culminates in the truth of axioms.

The historiography of Bacon's work presents natural inquiry as a communitarian exercise. Rose-Mary Sargent, for example, opens her chapter in *The Cambridge Companion to Bacon* with a stark contradistinction between Bacon and René Descartes which states, "[u]nlike Descartes . . . who retained the traditional philosophical emphasis upon the power on individual reasoning, Bacon sought to institute a new method for the investigation of nature, based upon the cooperative efforts of a large workforce."[313] Immediately, we take note of Sargent's use of the noun *reasoning* as qualified by the adjective *individual*. She juxtaposes this textual semantic pairing in the sentence against its inverse correspondent represented by

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[312] Bacon, *NO*, 157.
[313] Rose-Mary Sargent, "Bacon as an Advocate for Cooperative Scientific Research" in *The Cambridge Companion to Bacon*, ed. Markku Peltonen (Cambridge: Cambridge University Press, 2006), 146.

the plural noun *efforts*, qualified by the adjective *cooperative.* Sargent's intent is to starkly demarcate what she considers two distinct and opposed epistemological factions in the *doing* of science. However, in Baconian epistemology, these two factions represent different stages in the larger process of natural inquiry. We again refer to Bacon's bee metaphor: the bee, as an individual unit of the communitarian whole, contributes its "special gift [of] converting and digesting," what it gathers from nature.[314] The community, as a distinct entity, possesses no such ability to convert and digest. It can only receive that product. In the Baconian epistemological model, there is much work to be done on an individual basis before any cooperation can occur. If the engagement with and interpretation of nature, and the disciplinary preparation to do so, is very much an individual effort, then Bacon would attach a solemn caveat that the engagement occur according to much the same level and commitment of self-discipline as the perpetual, and definitively *thankless* work of those who have taken monastic orders. However, he might also argue that the stakes for the failure of self-discipline – for the failure of the individual bee to properly execute its duty of collection – are far higher for the natural inquirer than for the monk. Where a morally compromised monk may pay with his own soul and his own relationship to God, the failed inquirer puts the future of humanity and the useful integrity of knowledge in jeopardy with false or erroneous interpretation of natural truths. One bee can indeed taint the honey. In the prefatory material to *Novum organum*, Bacon vows that he does "not think to fail it [the enterprise of the *Instauratio magna*] or himself but [is] determined to try and set out on the only way open to the human mind."[315] Bacon's implication in this statement is that the integrity of the enterprise is inextricably bound to the integrity of the self – that is, the goodness and moral virtue – of the inquirer.

If the correction to Sargent's claim is semantically considerable, it does not require much textual emendation. The part of Baconian inquiry that falls under the operative aegis of reasoning proceeds not as a cooperative exercise, but as an individual pursuit. Reason, that which is inherent in the respective will of every human being, must be seduced by that individual's primary goodness. The human collective is not endowed with this potential. Thus, natural inquiry in the Baconian scheme begins with the effective self-disciplined husbandry of individual goodness and moral virtue. It proceeds from there to the individual sensory experience. The collaborative aspect of inquiry occurs when the individual inquirer has issued the literary record of experiment; Bacon considers the vessel of the written word the most effective transmitter of knowledge. It is only at the stage of dissemination that the

[314] Bacon, *NO,* 153.
[315] Bacon, *NO,* 5.

acquisition of knowledge becomes a facet of political manoeuvring, cunning, and the manipulation of communitarian consent in the theatre of civil knowledge.

Bacon's core sought-after result for natural inquiry, useful charity and the beneficence of Mankind, is possessed of a dual ontology and epistemology, one native to the individual moral and sensory experience, the other to the civil forum. The material forms of individual moral virtues are not linked to the moral behaviour of the civil realm. The behaviour which Bacon deems acceptable – or advisable – in the public and political sphere of human society is anathema to the individual realm of goodness, moral virtue, and natural inquiry, which, in all its delicate balances, must remain at a remove from, in Bacon's words, "town chatter."[316]

As we saw above in his early essay, "Of Followers and Friends," first published in 1597, Bacon prudently suggests that "to speake Truth, in Base Times, Active Men are of more use, then Vertuous." However, in 1620, Bacon will epistemologically qualify that political prudence with an admonition on behalf of individual goodness and moral truth.[317] He writes,

> I desire every last one of us be admonished to think on the true end of knowledge; that we seek it not for personal gratification, or for contention, or to look down on others, or for convenience, reputation, or power, or any such inferior motive, but for the benefit and use of life, and that it be perfected and regulated in charity.[318]

Thus, in response to Ian Box, we, in fact, see that Bacon considers the forum of civil behaviour, which includes prudent civil behaviour, to be "inferior" to the motives – and motions – that guide the individual project of inquiry. Individual goodness and the moral virtues that represent that goodness are the appetitive forces that bring the individual inquirer to the methodological process of natural inquiry. They are the forces within the human animal which mirror the positive, active, and chaste forces of nature. It is from this origin of primary goodness that the Good of Communion is secured, not, ironically, from the contentious theatre of the political community.

The Good of Communion does not overrule individual Self-Good, but requires that each individual project of moral husbandry – that is, the husbandry of positive, active, and appetitive moral material – be maintained in perpetuity. These two conditions are, in Bacon's project, equally crucial epistemological requisites to the successful human engagement with nature. As such, both are inherently related and participate in the positive methodological power of moral virtue.

Bacon does not place the coexistence of Self-Good and the Good of Communion in either an opposed or dialectical relationship. Rather, he describes them as the episodic stages

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[316] Bacon, *NO*, 153.
[317] Bacon, *Ess*, 148-149.
[318] Bacon, *NO*, 23.

of the active life. They are both necessary, but remain excluded from their respective spheres. Bacon only advocates for this operative division and shows that this exclusion cuts both ways. Not only is the din of the public sphere obstructive to the moral and sensory experience of natural inquiry, but the individual moral virtue of active Self-good may impede the political efforts which ensure the Good of Communion.

We again invoke Bacon's direct assertion that "[t]here is imbred and imprinted in every thing an appetite to duple Nature of Good."[319] In this assertion, Bacon denotes a common active principle formed and imprinted on everything in nature. That principle, as Bacon provides, is, in its efficient cause and natural state, good. *Goodness* serves as a causal force in iron as it does in men. That the principle is good confirms that it is active, and vice versa. Active principles in nature, possessed of causal and appetitive motion, and as such, purpose, are thus, good. The causal good that begins with the individual husbandry of moral virtue becomes the effective good that ends with charity and beneficence. Charity and beneficence are made of things in motion, not things static or inactive.

[319] Bacon, *OAPL*, 337.

Chapter 4: The Independent Agency of the Individual Baconian Inquirer

The voice of Nature will consent, whether the voice of Man doe or noe.[320]

4.1 Sense Versus Witness

This chapter qualifies the historiographical claims that Francis Bacon's philosophy stipulates a fundamentally collective or collaborative endeavour of natural inquiry. I assert that at the crucial initial stage of sensory-intellectual experiment, Bacon prescribes that natural inquiry be carried out according to the independent judgements of self-motivated and self-disciplined individuals who have deliberately placed themselves beyond the influence of communitarian influences. Bacon's model of natural inquiry begins as an ascetic pursuit of an "*active philosophy, from [an] intimate Converse with Nature*."[321] It is only when the inquirer has engaged what Bacon calls the "Arts of Discovery" that a methodological environment of sharing and collaboration can exist.[322]

Dana Jalobeanu describes this nuanced schematic of individual and communitarian practices in her discussion of Bacon's "learned experience." She explains that "[t]he learned experience is essentially a communitarian enterprise: in practising it, the experimenter enters a larger community and shares his practices, hypotheses and questions [and, we would add, his axioms] with all the other practitioners of the learned experience."[323] The crucial condition evinced by this quote is that the *individual* experimenter shares his own methodological and epistemological fruits – that is, his axioms – with the community once he himself had reaped those fruits through his own experience and his own marriage with nature, not before, or even during, the solitary phase of inquiry.

The experimental stage of Baconian natural inquiry is thus necessarily and fundamentally work governed by the practitioner's independent agency and self-discipline, not his solicitation of communitarian authority or assent. Bacon's is a material scheme wherein the experimenter's appetitive (material) goodness "seduces" the inherent, unclaimed reason of his own will.[324] It is from this primary material of *reasonable goodness* that the inquirer further cultivates the active forms of the moral virtues. The moral virtues work in

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[320] Bacon, *AL*, 90.
[321] See Bacon, *OAPL*, 21, and *passim*.
[322] Bacon, *OAPL*, 226.
[323] Dana Jalobeanu, "The Philosophy of Francis Bacon's Natural History: A Research Program = *Filosofia Istoriei Naturale Baconiene: Un Program de Cercetare*," *Studii de ştiinţă şi cultură* 6, no. 4 (decembrie 2010): 24. http://www.revista-studii-uvvg.ro/the-philosophy-of-francis-bacons-natural-history-a-research-program/.
[324] See Bacon, *OAPL*, 333.

concert with the intellect and both guide the mind and body in the sensory-intellectual endeavour of inductive experiment. As this chapter will address, such self-disciplinary effort is necessary to ensure the integrity of inquiry and contribution to posterity. The experimenter's judgments as to proper experiments can only extend from an independent sensory-intellectual experience which begins with the solitary engagement with the Natural Histories, to which Bacon refers as the "primary matter" of philosophy, and proceeds to what he deems appropriate inquiry.[325]

The human collective is fundamentally incapable of the judgment required to devise and interpret meaningful experiments. I assert that the first priority of the collective is civil-political order and consensus, whether that consensus is voluntary or coerced. Order and consensus are essential to the survival of the community and so take precedence over the discovery and acceptance of natural truths. Bacon emphasises the difference between the civil sphere of "goodness external," the successes of which do not require the truthful integrity of "internal [viz., individual]" moral virtues.[326] He has charged, as we have already visited, that "philosophy is run exactly as if it were some kingdom or state which in its deliberations and business relied on town chatter and gutter gossip instead of the correspondence and reports of trustworthy ambassadors and emissaries."[327] I note that Bacon here ascribes the notion of trust not to a collective, but to the reports of knowledgeable emissaries. These "emissaries" do not represent a particular class culture of communitarian authorities of inquiry. They instead serve as Bacon's metaphorical representations of self-disciplined natural inquirers who, having removed themselves from the civil stage and entered into an exclusive marriage with nature, can now be trusted as emissaries of natural truths. Their "reports" exist as the technical data of experimental literate experience, natural interpretation, and the axioms which they submit to time and "posterity to perfect."[328]

Bacon recognises that the collective environment presents precisely the wrong conditions by which an inquirer might seek and assess natural truths. He writes, "in a new enterprise, it is not only strong attachments to received wisdom that contributes to prejudice but also a mistaken preconception or advance view of the enterprise in question."[329] He notes that the prejudiced views which attend communitarian loyalty are prepared only to accept received wisdom and are incapable of accepting new knowledge. The natural inquirer must remove himself from such obstructive prejudices. Only later in the process of natural inquiry,

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[325] Bacon, *OFB*, vol. 6, 105.
[326] See Bacon, *OAPL*, 366.
[327] Bacon, *NO*¸ 157.
[328] Bacon, *OAPL*, 19-20. For literate experience and natural interpretation, see Bacon, *OAPL*, 226.
[329] Bacon, *NO*, 173.

after the undistracted inquirer first extracts and then submits axiomatic conclusions regarding his work does that work become a matter of collective assessment. It is then that the collective may participate either according to the magistral transmission of knowledge to popular science, or the initiative transmission of experimental and axiomatic epistemology to the future "sons of science."[330] At the initial sensory-intellectual stage of the epistemological process, the issue of collective "assent" promises, at best, uninformed judgements and, at worst, damage to the experiment.[331] Communitarian authority can only be political, not epistemological.

Bacon alleges that mankind has languished in an entrenched epistemological error made fast in the shared traditions of human communities. He thus demands a comprehensive reform in how knowledge is sought, imparted, and received. Natural inquiry must begin from methodological and epistemological scratch. It must proceed according to the informed and self-disciplined judgments of individual practitioners who have properly trained themselves to pursue what only posterity can confirm as useful knowledge. The inquirer is to break from sclerotic traditions and act individually as the independent, self-disciplined, and pioneering agent of the new knowledge. Only such "emissaries" can rescue the benighted civil community from the oblivion of useless epistemology. Bacon's natural inquirer travels alone from his initial absorption of the natural histories to their construction of axioms, during which time he acts as both discoverer and judge of his experiments.[332]

The seeds of collective benefit to humanity – the Good of Communion – are contained in a solitude of progression beginning with the inquirer's research into the natural histories, the subsequent construction of experiments, and his progress in the two Arts of Discovery: *experientia literata* (literate experience, by which experiments lead to further experiments) and *interpretatio naturae* (interpretation of nature, by which experiments lead to axioms, which themselves lead to further experiments).[333] Both of these are discussed in further detail below in the chapter. In this case, we note Bacon's description of the literate-experience stage of inquiry for its solitary character:

> When all the experiments and all the arts have been collected and arranged, and come within one man's knowledge and judgement, many new things, useful to our life and

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[330] For "sons of science" reference, see Bacon, *OAPL*, 272.
[331] Lorraine Daston observes, "If consensus about just what constituted the matter of fact in, for example, the recipe for phosphorus or anomalous suspension in air-pumps often eluded experimentalists, this was *a fortiori* true of strange phenomena observed fortuitously by only a few witnesses, and those often without sufficient natural philosophical training." Lorraine Daston, "Academic Civility, and the Prehistory of Objectivity," in *Rethinking Objectivity*, ed. Allan Megill (Durham: Duke University Press, 1994), 55.
[332] Bacon, *OAPL*, 245.
[333] Bacon, *OAPL*, 226.

> condition can be discovered by means of that very translation of experiments from one art to others, i.e., by that experience which I have called literate.[334]

For Bacon, even experiments that have yielded no solid conclusions are nonetheless valuable to other inquirers for their experiential narratives. Moreover, he emphasises that the epistemological ideal of natural inquiry prefers that new knowledge "come within one man's judgement." Only the individual is capable of judgement. Conversely, the community, as we have discussed above, is more inherently prone to prejudice.

4.2 Matters of Fact and Matters of Experience

In Bacon's view, it is through his own discipline of sense and intellect that the natural inquirer performs his judgements of experimental results. Bacon describes this process as "*Judgment, or the Art of Judging, which handleth the Nature of Proofes, or Demonstrations*."[335] He further divides the art of judgment according to a rubric of conclusions made either by "induction" or "syllogism" (of which he, of course, prefers the former).[336] Bacon provides no explicit prescription in this discourse that induction proceed in a collective rather than individual context. The authority of judgment in the experimental realm of proofs and demonstrations rests alone with the solitary, judging inquirer. He asserts:

> *As for Iudgment* that by *Induction* we need nothing doubt. *For by one and the same Operation of the Mind, that which is sought is both found and Iudged*. Neither is the thing perfected by any meane, but immediately after the same manner, for most part, as it is in *Sense*: For *Sense*, in hir Primarie objects, doth at once seize upon the species of an object, and consent to the truth thereof.[337]

Thus, in the initial stages of sensory-intellectual inquiry, Bacon cedes no inductive methodological authority to any collective body, be it one comprised of witnesses, colleagues, or intimates. We note above that he assigns an equal power of validation both to judgment *and* to discovery: "that which is sought is both found and judged" by the "same operation of the mind." Both the concept and activity of "discovery" imply a solitary seeker. Communities do not "discover" things. Rather, they receive and learn about discoveries through the transmission of knowledge from those who have obtained that knowledge by first-hand induction and accounted for it in the *experientia literata* and *interpretatio naturae*. As Bacon indicates, the earliest stage at which a collective may become involved with a particular practitioner's inquiry is at the *experientia literata* juncture. Literate experience involves a

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[334] Bacon, *NO*, 161.
[335] Bacon, *OAPL*, 245.
[336] Bacon, *OAPL*, 245.
[337] Bacon, *OAPL*, 245.

voluntary act of information-sharing on the part of the practitioner. It does not involve the submission of experimental processes or discoveries to a vetting collective of witness authorities for approval.

The collective receives the light of individual discoveries either through what Bacon distinguishes as the *Magistrall* or the *Initiative* methods of transmission.[338] The former method, *Magistrall*, "*requires our beliefe to what is delivered*," while the latter, *Initiative*, requires "*that it* [viz., what is taught] *may rather be submitted to examination*.[339] While both represent modes of pedagogy, Bacon illustrates to his readers how the *Magistrall* method, which is less epistemologically fecund, carries the implication of collective reception of popular – that is, *static* – knowledge. Its more fertile counterpart, the *Initiative* method, suggests the progression from knowledge reception to a subsequent endeavour of heuristic individual inquiry on the part of the receivers. Bacon explains, "*[t]he one* [*Magistrall*] *delivers popular Sciences fit for Learners; the other* [*Initiative*] *Sciences as to the Sonnes of Science: In summe, the one is referred to the use of Sciences as they now are; the other to their continuation, and further propagation.*[340] We note the semantic nuance which distinguishes the *passive* "learners" from the *active* "Sonnes of Science." The former embodies collective stasis, the latter, the forward motion of driven individuals toward the benefit to posterity.

Analysis of Bacon's *Magistrall* and *Initiative* modes of transmission clearly illuminates his views regarding the respective practices of collective and individual natural inquiry and acquisition of knowledge. He directly associates inquisitional stasis with a collective reinforcement of the status quo [viz., *Magistrall* transmission] wherein "hee that learneth, desires rather present satisfaction, then to expect a just and stayed enquiry."[341] In his view, knowledge which confirms present sensibilities is bereft of any useful benefit to posterity. His invocation of the abstract plural "Learners" in the description of *Magistrall* transmission suggests the association of knowledge ("*popular Sciences*") with non-expert, non-practising collective culture.

This condition is inverse to Bacon's contention that the transmission of useful knowledge to posterity can only be assured by the experimental initiative of the "Sonnes of Science." The plural term "Sonnes" suggests the image of individuals who are joined by virtue of their respective independent inquiries *and* independent agencies. At a distance from

[338] Bacon, *OAPL*, 272.
[339] Bacon, *OAPL*, 272.
[340] Bacon, *OAPL*, 272.
[341] Bacon, *OAPL*, 272.

the influence of "popular Sciences" (and thus popular opinion), these Sonnes may then construct apposite experimental means of examination in which, again, they may act respectively as both discoverer and judge. By virtue of their independent agency (which does not preclude their having experienced a *Magistrall* education), they are sufficiently empowered to carry out their experiential examinations without having to petition their informed assessments to a superfluous authority of collective consent.

Thus, we must use caution when we encounter such analysis as that submitted by Shapin and Schaffer, which we have visited in Chapter 3. Their work as collaborators, and (particularly in Shapin's case) as independent researchers, invests the power of consent, or validation, bestowed by multiple human *witnesses* as the primary authority of methodological and epistemological validation. In their influential work, *Leviathan and the Air-Pump*, the subject of which is the experimental career of Robert Boyle, they assert that facts are *candidates* for truth which are to be believed, accepted, or dismissed, by a given community.

The authors contend that "[t]o identify the role of human agency in the making of an item of knowledge is to identify the possibility of its being otherwise. To shift the agency onto natural reality is to stipulate the grounds for universal and irrevocable assent."[342] For Bacon (and, I would argue, for Boyle), this is manifestly problematic and constitutes a regression to scholastic dialectic. According to Shapin and Schaffer, what is considered and accepted as factual knowledge is contingent upon witness confirmation and the communitarian consensus through which that knowledge receives or does not receive recognition as a matter of fact. We can contrast this to what we have seen as Bacon's contention that natural truths are the stuff of axioms which acquit themselves over time by their natural, utilitarian, and philosophical integrity.

However, according to Shapin and Schaffer, human reality and, as such, natural inquiry, are, in essence, dependent on the mutual interpretive experiences of multiple human beings. Referring to Robert Boyle's milieu, they write,

> An experience, even of a rigidly controlled experimental performance, that one man alone witnessed was not adequate to make a matter of fact. If that experience could be extended to many, and in principle to all men, then the result could be constituted as a matter of fact. In this way, the matter of fact is to be seen as *both an epistemological and social category*. The foundational item of experimental knowledge, and of what counted as properly grounded knowledge generally, was an artifact of communication and whatever social forms were deemed necessary to sustain and enhance communication.[343]

[342] Shapin and Schaffer, *Leviathan*, 23.
[343] Shapin and Schaffer, *Leviathan*, 25. Emphasis mine.

That "experience [should] be extended to many" proves particularly problematic relative to Bacon's precepts for the reform of natural philosophy and natural inquiry. Shapin and Schaffer's mode of truth-assessment requires the inclusion of commonly-held communitarian *beliefs* (which Shapin, in his *Social History of Truth*, will expressly assert; see below, next paragraph) to serve as the trust-bond material which coheres amongst a distinct collective. Thus, communitarian beliefs inform scientific reality, and a matter of *fact* must, on a fundamental level, be *believed* in order to qualify as a *matter of fact*. The logic espoused by Shapin and Schaffer, which assesses reality and truth as human constructs, asks on what other authority but belief could a collective base their mutually-agreed bond of trust regarding natural truths.

In *A Social History of Truth*, Shapin submits that "[f]or historians, cultural anthropologists, and sociologists of knowledge, the treatment of truth as accepted belief counts as a maxim of method, and rightly so."[344] He includes beliefs as valid criteria in the qualification and quantification of natural truths. Thus, natural truths are necessarily to be remanded to the authority of human truths. Shapin thus defines truth as a form of *human* reality. Bacon disagrees, designating reality and truth as facets of nature – and, as such, divinity itself – which human beings can only – but must – attempt to understand. Bacon implies that truth exists with or without human consent or recognition. He writes,

> So let men know . . . how great is the gulf between the *Idols* of the human mind and the *Ideas* of the divine. For the former are nothing more than abstractions made arbitrarily, whereas the latter are authentic seals that the Creator has stamped upon his creatures according as they are impressed and defined in matter by true and exact lines. *Thus truth and utility are . . . the very things themselves*; and the very works give much more as guarantors of the truth, than providers of material benefits.[345]

Bacon here asserts that "truth and utility," as "Ideas of the divine," are therefore, like all second causes, possessed of material properties (viz., appetites) which exist in nature, upon which they are stamped by the Creator. They are "defined by true and exact lines" and thus are not any more the products of the human intellect as is a honeybee or, moreover, the honeybee's usefulness in nature. Truth and utility are natural conditions that the human intellect should aspire to emulate. Truth and utility are, in fact, themselves tantamount to primary matter; that they are materially basic and cannot be reduced and are built into the foundation of all things in nature. Conversely, for Shapin, truth and reality extend from conditional sources of social trust and communitarian acceptance, and thus collective, expressly *human*, authority. Shapin places all measures of truth assessment, notably the

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[344] Shapin, *ShoT*, 4.
[345] Bacon, *NO*, 187. Emphasis mine.

activity of natural inquiry, directly into the epistemological remit of the *civil* sphere, the hazards of which I have discussed at the close of the previous chapter. Thus, for Shapin, matters of fact do not qualify as (to use Bacon's words) "true pattern[s] of the world as we actually find it,"[346] but as matters of trust, fidelity, justice, and, indeed, belief.

Natural truth in Shapin's view becomes a facet not just of the political, but of the collective moral order, as well. However, he unwittingly reveals the fundamental weakness of collective epistemology in qualifying truths when he challenges that "[t]he order of society depends upon (some sociologist would say that it *is*) a complex of normatively ordered expectancies. How could coordinated activity of any kind be possible if people could not rely upon others' undertakings?"[347] This is precisely why Bacon insists that natural inquiry in its initial sensory-intellectual stage be removed from the pull of social and communitarian expectations. The incentive to deliver natural truth in Shapin's case extends not from discovery, but from "normatively ordered expectancies" which defer to the social equilibrium of trust. He proceeds with the rhetorical assertion that "those who cannot be trusted to report reliably and sincerely about the world may not belong to our community of discourse."[348] To this, Bacon might respond:

> [A]lthough I serve the Republic of Mankind, our common homeland, with the greatest devotion, I am not free to exercise the reasoning and choice of that legislator. For I do not give laws to the intellect or to things at my own good pleasure but, as a faithful scribe, I take down and copy out ones dictated and proclaimed by the very voice of nature itself. Therefore, whether they find favour or get dismissed by the collective voice of the people with other ideas, I should keep complete faith with nature.[349]

In Bacon's view, the natural inquirer cannot, at least in the initial stages of inquiry, serve two masters. He obeys only nature and does so at the expense of whatever the community expects or desires of him or his discoveries. As we see *passim* throughout his work, Bacon finds that the community, fully given to its primary effort of preserving order and consensus, is satisfied with untruths.

On behalf of Bacon and Boyle, one might respectfully ask Shapin where exactly a trustworthy and sincere report about the world might originate if not from the experimental discovery and judgement of a single mind. One might further ask exactly how a collective could serve as a disciplined instrument of experiment. Bacon himself might be prompted to ask Shapin and Schaffer what they would consider the *function* of a matter of fact to be. Are the respective purposes of knowledge and matters of fact coterminous? Shapin and Schaffer

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[346] Bacon, *NO*, 187.
[347] Shapin, *ShoT*, 8.
[348] Shapin, *ShoT*, 36.
[349] Bacon, *PA*, 260-261.

emphasise that the confirmation of matters of fact is the desired end of scientific inquiry and that they comprise the essential substance which enables human knowledge and dictates human behaviour.[350] Matters of fact contribute to a "system of physical knowledge" by virtue of which "one could have [that] highest degree of probabilistic assurance: 'moral certainty.'"[351] From this, they arrive at the challenging question: "If universal and necessary assent was not to be expected of explanatory constructs in science, how then was proper science to be *founded*?"[352]

We turn back to Bacon's *scientia* (that is, *knowledge*), which is built upon the human concourse with nature. Such a concourse and its contribution to true knowledge is rooted not in the "objective," civil moral certainty enabled by matters of fact, but, in Bacon's radical view, by the experience of the *uncertain* but morally-disciplined practitioner. He likens the experience of the inquirer to the lone traveller in a labyrinth who can rely on none but his own soundness of mind and moral fortitude for his progress. In the labyrinth, even his senses deceive him. Added to his extreme condition is the urgency that those same senses and the intellect (and moral virtues) which governs them operate at a fullness of discipline and potential to record the "true patterns of the world as we actually find it."[353] The hand and mind of inquiry must be not only steadfast but strong enough to engage in sceptical and critical assessment so that the seeker can achieve the construction of axioms and fulfil his duty to posterity. Bacon thus places emphasis not on empirical certitude (errors, like truths, will out over time and with future inquiry) but on the necessity of a *self*-discipline of moral and intellectual virtues. These virtues constitute what Bacon provides as the "Rule of proceeding." In the following passage, we encounter no reference to a civil theatre of authoritative social trust-bonds. In fact, in the Baconian milieu of the natural inquirer, we see no comforts of society at all, only "doubtful passages and deceivable resemblances":

> *[T]he Fabrique of the Universe to the contemplative eye of the Mind, for the frame thereof is like some Labyrinth or intricate Maze, where so many doubtfull passages; such deceivable resemblances of Things and Signes; such oblique and serpentine windings and implicite knots of Nature everywhere present themselves, as confounds the understanding. And withal, we must continually make our way through the woods of Experiences, and particular Natures, by the incertain Light of Sense, sometimes shining sometimes shadowed: yea and the guides, which […] offer their assistance, they likewise are entangled, and help to make up the number of Errors and of those that Erre. In matters of such perplex difficulty, there is no relying upon the* Iudgement of men *from their own abilities, or upon the* Casuall Felicity of Particular events; *for neither the* capacity of Man, *how excellent soever; nor the* chance of Experience, *never*

[350] Shapin and Schaffer, *Leviathan*, 23 ff.
[351] Shapin and Schaffer, *Leviathan*, 24.
[352] Shapin and Schaffer, *Leviathan*, 24.
[353] Bacon, *NO*, 187.

> *so often iterated and essayed, is of force to conquer these mysteries: we must march by line and level, and all the way, even from the first perception of Senses, must be secured, and fortified by a certain Rule, and constant Method of proceeding.*[354]

I note here the fundamental disparity between Bacon's and Shapin's respective paradigms of natural inquiry. Bacon is intent on conveying that understanding and knowledge are products of an ongoing engagement, one that is likely to continue in perpetuity. Knowledge and understanding do not serve a final authority of matters of fact or collective judgement. Bacon warns further that "there is no relying on the judgement of men [viz., the inquirers themselves] from their own abilities" to conquer the mysteries of nature. He accepts that "[t]he subtlety of nature far surpasses the subtlety of sense and intellect, so that all our choice meditations, speculations, and controversies are mere madness."[355] He thus remands the assessment of truth to the authority of time, nature, and to the sons of science, who, themselves destined to enter their own labyrinths, might only hope to be armed with the experiential and axiomatic light of their forbears.

Bacon would argue that, on a basic methodological and epistemological level, trust is not an element of nature and so is a superfluous concern to one in close concourse with nature. The would-be matters of fact in Bacon's view of natural inquiry are merely *matters*. These do not appear before a communitarian plenum of consenting witnesses; they are entered by the inquirer directly into his record of axiom and literate experience, and ultimately into the Natural Histories, the primary material of philosophy.[356]

The material of existing natural histories, the familiarity with which Bacon insists must precede the inquirer's entry into experiment (as his axioms and literate experience must follow the experiment), pre-emptively supplant Shapin's and Schaffer's paradigm of communitarian belief, collective assent, and matters of fact. If matters of fact are subject to collective trust and assent, then they are in fact, matters of human politics, something to be won through a success of persuasion amongst the human collective. Bacon considers the civil intrusion into the ascetically-disciplined condition of solitary inquiry to be lethal to proper natural interpretation. As we have seen in Chapter 3, he differentiates between what is good for the individual and what is good in the civil theatre. The former must feed the latter (much like individual inquiry feeds collective epistemology), and the reverse cannot be so. Thus, the weakness of matters of fact: they are, in fact, assessments drawn from human interaction with humans, not human interaction with nature. Bacon writes,

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[354] Bacon, *OAPL,* 13-14.
[355] Bacon, *NO,* 67.
[356] Bacon, *PAH,* 455-457.

> *As for those who have given the preeminence unto* Logique*, and are of opinion that the surest Guards for Sciences must be procur'd from thence; they have truly and wisely discerned, that the mind of man, and Intellective Faculty left unto itself, may deservedly be suspected. But the remedy is too weak for the disease, and is it self not exempt from Distemperature; for the* Logique *in force, though it may be rightly accommodated unto matters* [of] Civile *and* Populare Sciences*, which consist in* Discourse *and* Opinion[,] *yet it comes farre short of penetrating the* subtlety of Nature; *and undertaking more than it can master,* seemes rather to stablish and fixe Errors than to open a way to Truth.[357]

Bacon warns against the inevitable hazards of fact and logic, which, as "matters Civile and Populare" may just as well serve error as truth. The suspect mind and "Intellective Faculty left unto itself" require considerable discipline so that they act in accordance with nature, not with errors of logic.

Citing what he considers the errant epistemology of the ancients, Bacon describes the human tendency, especially in the communitarian context, to influence and control the inconvenient vicissitudes of natural inquiry. This has been detrimental to the natural histories, which is to say, detrimental to posterity:

> If […] new particulars and examples were put forward or adduced which would break their dogmas, they [the ancients] subtly coaxed them back into line with distinctions or elaborations of their rules, or else they rudely shoved them out of the way by making exceptions of them. But with the causes of particulars, particulars which posed no threat, they laboured with stubbornness to accommodate them to their principles. But that was not natural history and experience as it should have been […] and this flight to the most general principles wrecked everything.[358]

If natural philosophy is to serve communitarian expectancies, inquiry is bound to produce acceptable conclusions, anticipated conclusions (Bacon's *Anticipations*).[359] There can be no "doubtfull passages or such deceivable resemblances of Things and Signs" in the realm of *Anticipations*. The community, whether comprised of witnesses or of magistral learners, is obliged by their fealty to the collective to dismiss the appearance of doubtful passages as evidence of a failed experiment. The collective desire for consensus will, as Bacon notes, wreck the search for truth. Bacon senses the danger inherent in remanding matters of fact, if they are to be considered tantamount to natural truths, to standards of validity and legitimacy that may be determined (which is to say, manipulated) by any group – or individual, for that matter – for whom matters of fact are but elements of social or any other type of identity.

Thus, we note Bacon's insistence that natural inquiry be fully removed from the very context of collective sanction (which cannot help but bode tendentious expectation) that

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[357] Bacon, *OAPL*, 13.
[358] Bacon, *NO*, 189.
[359] Bacon, *NO*, 175.

Shapin and Schaffer assert natural inquiry must occupy. Invoking the subject of their study, they contend that

> [i]n Boyle's view the capacity of experiments to yield matters of fact depended not only upon their actual performance but essentially upon the assurance of the relevant community that they had been so performed […] If knowledge was to be empirically based, as Boyle and other English experimentalists insisted it should, then its experimental foundations had to be *witnessed*.[360]

Pursuant to Bacon's concerns regarding the natural tendency of the collective to protect its beliefs and dogmas at the expense of natural truths, we note the text which follows in Shapin's and Schaffer's above passage. In the defence of their position, they submit the question of how to deal with individual dissent:

> Many phenomena, and particularly those alleged by the alchemists, were difficult to accept by those adhering to the corpuscular and mechanical philosophies […] [Further,] [t]he problem with eye witnessing as a criterion for assurance was one of *discipline*. How did one police the reports of witnesses as to avoid radical individualism?[361]

It is significant that Shapin and Schaffer attribute the implied tendency to manipulate experimental evidence with "radical individualism." Conversely, Bacon convincingly illustrates that it is rather the collective, marked by its schedule of expectancies rooted in communitarian beliefs and social order that reveals a greater motivation to "subtly coax" inconvenient results "back into line with distinctions or elaborations of their rules."[362] We are reminded of Bacon's admonition against "common consent, seeing that even if men went mad in the same copycat way, they could still agree among themselves well enough."[363] Regarding Shapin and Schaffer's assertion above, we would be forgiven for a request of clarification as to the precise aspect and nature of individual dissent from the collective witness consensus that might threaten to put the experiment at risk. What motivation would a "radical" individual have for dissenting from the witness collective? What motivation would the witness collective have for neutralising the dissent of an individual? The witness-testimony argument as it stands would seem to require more conditional information than Shapin and Schaffer provide.

4.3 Truth, Lies, and Secrecy

In Chapter 3, I discussed Bacon's contention that the self-disciplinary human tools which enable the natural inquirer to discover natural truths (viz., individual goodness, moral virtue,

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[360] Shapin and Schaffer, *Leviathan*, 55-56.
[361] Shapin and Schaffer, *Leviathan*, 56.
[362] Bacon, *NO*, 189.
[363] Bacon, *NO*, 75.

sense, and intellect) are often either inappropriate or superfluous to proceedings within the civil theatre. In his 1612 essay "Of Cunning," Bacon advises that "it is one thing to understand Persons, and another thing to understand Matters; For many are perfect in Mens Matters, that are not greatly Capable of the Reall Part of Businesse."[364] Bacon implies that the "real part of business" involves modes and tactics that require the suspension of normative civil and moral behaviour. In the political realm, the ends justify the means and thus, the means must serve the ends. Thus, we approach Shapin's argument in *A Social History of Truth* which emphasises that trust is a failsafe corrective against the lie and the kin of the lie, secrecy. However, we will see below that he is equivocal on the matter. Bacon, for his part, is not.

Shapin considers natural truths to be the product of a social-political system of trust and testimony. Bacon, while he would agree with Shapin that certain tactics must be adopted in the respective areas of "men's matters and real business," considers the assessment of natural truths to rely for its integrity on the natural inquirer's ascetic bond with nature. Bacon, the "natural philosopher," expresses his impatience with the individual inquirer who would adopt a policy of secrecy regarding that inquirer's discoveries about the workings of nature. However, Bacon the "politician" quite *un*-hypocritically describes the value of secrecy and dissimulation in the collective, or civic/political theatre.[365] Shapin would agree with Bacon's assessment wherein

> if a man be thought *Secret*, it inviteth discoverie; As the more Close Aire, sucketh in the more Open: And as in Confession, the Revealing is not for worldly use, but for the Ease of a Mans Heart, so *Secret* Men come to the Knowledge of Many Things, in that kinde; while Men rather discharge their Mindes, then impart their Mindes […] Besides (to say Truth) *Nakedness* is uncomely, as well in Minde, as Body; and it addeth no small Reverence, to Mens Manners, and Actions, if they be not altogether Open.[366]

In *A Social History of Truth*, Shapin expressly acknowledges Bacon's "pragmatic sensibility" in this regard.[367] He (Shapin) further issues the disclaimer that "truth-telling was […] *relative to setting*."[368] However, it is this very disclaimer that belies the fissures in Shapin's trust-bond foundation of methodological and epistemological integrity. How can the assessment of natural truths exist in an environment where truth-telling, the very basis of epistemological validity, is relative to setting? Shapin considers natural inquiry to be a communitarian, civil-

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[364] Bacon, *Ess*, 69-70.
[365] See Bacon's 1625 essay "Of Simulation and Dissimulation" in *Ess*, 20-23.
[366] Bacon, *Ess*, 21
[367] Shapin, *ShoT*, 103.
[368] Shapin, *ShoT*, 103-104.

political process. Bacon insists that natural inquiry must be kept separate from the political theatre until it (natural inquiry) has been codified by the individual inquirer as axiom.

Bacon's position on the interpretation of nature brooks no such relative conditions of secrecy, lies, probity, or moral correctitude; these are all *civil* concerns. Thus, natural inquiry must be pursued as an ascetic endeavour. For the inquirer, the pious oath to God becomes the pious oath to Nature. Bacon treats the natural histories – again, the primary material of natural philosophy – as anything but civil political documentation. They are, to the natural inquirer, as scripture. He writes, "I want this primary history to be written up with the most religious care, as if the truth of every single detail had been given under oath, since this is the book of God's works and (insofar as we can compare the Majesty of divine things and the insignificance of mortal) another kind of Holy Writ."[369] There is no place for civil lies and secrets in Bacon's natural inquiry.

Shapin defends the civic substance of his trust- and belief-based theatre of inquiry and questions whether *secrecy* should be concordantly implicated with "lying" in the dualistic scheme of "*truthfulness* and *lying.*" He concedes (as has Bacon relative to the civil/political sphere) that "[s]ecrecy might be laudable."[370] He acknowledges the exceptional circumstances which infuse the political theatre which allow for moral ambiguity. He testifies, in fact, that "[he does] not know of any early modern author who argued that gentlemen had [no] obligation to tell their secrets to all, upon all occasions."[371]

Bacon the civilian could surely echo that claim. However, we must then question what this allowance means for the integrity of the trust-bond material that would hope to construct a common perception of reality on which the assessment of natural truths could depend. We recall that Shapin places the quantifiability of knowledge in the collective, civil theatre, where (as both he and Bacon allow) secrecy can be defended, even recommended, as a tactical act of political prudence.

However, Shapin contradistinguishes that which he accepts as functional and routine secrecy against the rigid iniquity of "the falsehood that went under the name of a *lie*."[372] We are thus forced to ask what vetting mechanism in the civil theatre might restrain the venial secret from the becoming the mortal lie. Problematically, if scientific truth and reality are, as Shapin contends, civil and communitarian concerns, then, as such, they must be well-suited to

[369] Bacon, *NO*, 469.
[370] Shapin, *ShoT*, 103, 106.
[371] Shapin, *ShoT*, 105.
[372] Shapin, *ShoT*, 106.

abide both secrecy and the routine exchange of lies. Here, the effective difference between secrets and lies is epistemologically inconsequential.

However, if secrecy is not as condemnable as a lie in Shapin's civil political realm, we must ask how secrecy and lying compare in the Baconian realm of individual natural inquiry. The problematic issue extends from Shapin's implied assumption that individual natural inquirers might consider themselves free to be secretive or lie (and get away with it) about their findings and discoveries simply because they have worked alone. We are thus obliged to ask to whom or in what context they would lie, and why. Even if our hypothetical lone Baconian inquirer were driven to lie, in what manner or by what vehicle, had he no interaction with the vetting collective, would he convey his lies? What, exactly, in the realm of literate experience and natural interpretation might the *purpose of lying* be? To persuade? To gain accolade for results? To gain favour with the collective? It could not serve an attempt to perpetuate the illusion that something which hadn't worked *had* worked.

Bacon's natural inquirer is in close converse with nature with a mind wedded in a bride-chamber to the universe.[373] The lone natural inquirer driven to lie would have recourse, absurdly, only to an attempt to lie to himself or to nature. He could have no political motivation. Thus, Shapin's paradigmatic argument comes full circle: by his own logic, lying and secrecy could *only* serve the natural inquirer if the field of natural inquiry *were*, indeed, fully political, that is to say, were a matter of collective, communitarian consensus and assent. Shapin has, in effect, conceded that the very trust-bonds which are supposed to carry and protect the transmission of natural truth are intrinsically prone to manipulation.

This is not the case in the bride-chamber of Bacon's lone, ascetic natural inquirer. In *that* realm, where sensory-intellectual experience distils directly into a reservoir which, like charity itself, "admits no excess," and, as such, no regress, lying and secrecy are not only superfluous to the operation, but manifestly and functionally impossible.[374] Bacon's philosophy dictates that lies, which may be seen as a species of error, do not, *can*not survive the axiomatic and progress of individual inquiry, which is built on a sacrosanct marriage and converse with nature. Regarding errors, Bacon asserts that "the truth of axioms […] will refute the falsehood of experiments, unless the latter swarm everywhere."[375] In that process, any lie would disintegrate and disappear over time, over the "lapse of centuries."[376] Thus,

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[373] Bacon, *OAPL*, 30.
[374] Bacon, *Ess*, 38-39.
[375] Bacon, *PAH*, 467. To this point, in said Aphorism 118, Bacon further points out that "if the errors in natural history and the experiments are considerable, recurrent and repeated, no stroke of wit or art [or, we may assume, the authority of collective consensus] can correct or put things right." (Bacon, *NO*, 177).
[376] Francis Bacon, "Thoughts and Conclusions," 73.

were it even possible for the individual inquirer to lie, it would be a useless, zero-sum endeavour, an act of self-actualised futility. Bacon has, in fact, constructed a philosophical and epistemological theatre wherein the truth of axioms will out even despite the inquirer; lies, like errors, cannot and will not survive the test of time or the truth of nature.

Bacon's individual natural inquirer is as equipped to lie about his results and discoveries as is the solitary religious ascetic about their exegetical analysis. Where the latter would find himself in the absurd position of attempting to lie to God in a one-on-one conversation, the former would find themselves in the absurd position of attempting to lie to nature in a one-on-one conversation. The lie only becomes possible, perhaps becomes inevitable, when the solitary inquirer *or* the solitary ascetic is suddenly forced to provide, or even demonstrate, their experimental worth to an authority of would-be witnesses. It is only in the *political* theatre of Man that the authority of Holy Writ and the truth of nature can be successfully over-ridden and *survive*.

If Bacon accepts, even recommends, secrecy in the political theatre, he categorically abhors it in the theatre of natural inquiry. In particular, he recognises secrecy as an intrinsic and traditionally normative short-coming in the realm of medical and medicinal inquiry.[377] Bacon's human instrument of inquiry, regardless of experimental discipline, finds secrets not just tantamount to lies: secrecy represents a wilful neglect of posterity and charity, the very objects of the human inquiry into nature. To wit, in *The Advancement of Learning* (1605), Bacon describes the erstwhile failure of physicians to supply posterity with their discoveries. In Bacon's time, physicians served as the initial, ready models of hands-on, utilitarian natural philosophy who might apply themselves through their work to the benefit of humanity. He at once offers his critique of then-existing pathology while extolling the crucial role of literate experience in perhaps its most apt theatre:

> [A]s for the footsteps of diseases, & their deuastations of the inward parts . . . they ought to haue beene exactly obserued by multitude of Anatomies, and the contribution of mens seuerall experiences; and carefully set downe both historically according to the appearances, and artificially with a reference to the diseases and symptoms which

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[377] An impatience with medicinal secrecy was the primary, signature, and motivating bane not only of Robert Boyle and his early experimentalism. Lady Ranelagh (Boyle's sister) and Samuel Hartlib were also driven by an activism in the sharing of so-called medicinal "receipts." Boyle wrote his first tract expressly intended for publication in early May 1647 at the age of twenty-one. His direct correspondence with Hartlib was new, having begun the previous March. Finally published in 1655 as the sixth article in Hartlib's *Chymical, Medicinal, and Chyrurgical Addresses made to Samuel Hartlib*, the full title (entered by Hartlib) of Boyle's piece is "An Epistolical Discourse of *Philaretus* to *Empyricus*, written by a Person of singular Piety, Honour, and Learning, inviting all true lovers of Vertue and Mankind, to a free and generous Communication of their Secrets and Receits in Physick." See Margaret E. Rowbottom, "The Earliest Published Writing of Robert Boyle," *Annals of Science* 6, no. 4 (1950): 376-389, https://doi.org/10.1080/00033795000202061. Also, see R.E.W. Maddison, "The Earliest Published Writing of Robert Boyle," *Annals of Science*, 17, no. 3 (1961), 165-173, https://doi.org/10.1080/00033796100202611. Maddison discusses a subsequent tract by Boyle entitled "An Invitation to Communicativeness," also intended for Hartlib.

> resulted from them, in case where the Anatomy is of a defunct patient; wheras now vpon opening of bodies, they are passed ouer sleightly, and in silence.[378]

Discoveries and the substance of axioms that inquirers (in this case, physicians) either neglect to note or record, or that they otherwise keep as secrets, constitute offences that match Shapin's worst-case hypothetical scenario wherein the members of a society do not, or *can*not, trust one another to tell the truth. It is not the solitary acquisition of knowledge that Bacon finds pernicious; it is the neglect or refusal to subsequently share it. Silence, or secrecy, in this context of experiment is more damaging than a lie, which, as we have noted above, will be flushed out of the epistemological history along with the errors. Bacon's comparison of natural histories to scripture is neither frivolous or metaphorical. For an inquirer not to share his *literate experience* as a scribe to nature is akin to an apostle not sharing his literate experience as a scribe to God.

Bacon's epistemological scheme accounts for the inevitable dysfunction of the human interpretive instrument. Lies and errors, even if they manage to capture a broad synchronic monopoly over common knowledge and are routinely circulated amongst the collective, cannot achieve authority over natural truths in the fullness of time. The sons of science alone will see to that. In his hypothetical scenario, even unforgiveable lies (like inevitable honest errors) can nonetheless only achieve a venial status as the inevitable hazards of natural inquiry. They will manifest as superfluous methodological glitches, even absurdities, doomed to become extinct through the axiomatic progress of the self-disciplined inquirer who has husbanded his material goodness in the "Bride-chamber of the Mind and of the universe."[379] Bacon's caveat to this surety is that the marriage must, in fact, remain free of communitarian influences and pressures. In his scheme, lies, like honest errors, suffocate and expire quite literally by natural causes under the accumulated grains of axioms which gather over time. Axiomatic knowledge gained through the self-disciplined engagement with nature does not allow false epistemology to become codified and sealed as unchangeable traditions which appease the belief-based expectancies of the communitarian collective.[380] We can only be encouraged on Bacon's behalf to suspect whether the civil theatre could ever be the appropriate forum in which to remand matters of trust regarding *natural* truth and reality. He

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[378] Bacon, *AL*, 100.
[379] Bacon, *OAPL*, 30.
[380] "Tradition" as a nominal facet of Bacon's advancement of learning concerns the specific "Arts touching Words, and Speeches" which serve the crucial "*Art of Delivery, or of Expressing, and Transferring those things which are Invented, Iudged, and laid up in the Memory*." Tradition, in Bacon's view, refers to grammar, words, and even hieroglyphic symbols which must be properly applied to transmit knowledge on a level with the Natural Histories. See Bacon, *OAPL*, 257 ff.

is adamant that the interpretation of nature be free of communitarian pressures, which only nourish the mind's obstructive Idols.

Bacon draws a distinct line of separation between the environments which he respectively classifies according to individual and collective moral ontologies. The *Good of Communion*, which describes that which is best for the collective whole of humanity, involves matters of intrapersonal, individual human conduct. But this realm can only follow that of the Individual Good, where natural truths are discovered. Natural truths can only be lost amongst the manoeuvres of communitarian conduct required of individuals in the civil theatre.[381] Bacon sees the individual goodness of the inquirer, like the truths in nature he seeks to interpret, as having material properties. Its motion is appetitive. However, the motion of civil conduct is not appetitive, serves only the status quo, and provides nothing to posterity. Bacon's goodness is indeed the primary, positive, and active material of the human mind analogous to the primary, positive, and active material that is inherent in nature.

The civil-political theatre, as both Shapin and Bacon see it, is a maelstrom where dissimulation (which Shapin defines as "an intentional withholding of truth when truth-telling might be deemed appropriate"), lies, and truths share the same political stage and become not only functionally indistinguishable from one to the other, but, in fact, are interchangeably useful and productive within that civil context.[382] The civil theatre exists to serve the collective status quo and thus it abides such contingent behavioural tactics as lying and hiding the truth, or, for that matter, hiding the lie. This environment, and the tactics which define and sustain it, is lethal to the sensory-intellectual interpretation of nature. Bacon implores natural inquirers to behave as pious ascetics, that is, as children, as yet unfound by false wisdom, who are able to purely connect with the world of nature (see quote below). He makes no allusions to a secondary human authority invested with the power to assess the validity of experiments. He alludes only to the value and power of moral self-discipline and the seduction of reason by individual goodness.

In the following passage, Bacon infuses each implication of collective epistemology in natural inquiry with the unmistakable semantic of *impediment*, and, correspondingly, each implication of individual sense and assessment with the light of correctitude:

> I am then certainly undertaking the most serious business of all and most worthy of the human mind, that nature's light, pure and quite unclouded by vain imagination […] may be lit in this age of ours by a torch furnished and brought near by the Divine Will. For I do not hide the fact that I believe that that preposterous subtlety of argument and thought can by no means put things right again, though all the intellects of all ages be gathered together, when, at the proper time, the subtlety and truth of the basic

[381] Bacon, *OAPL*, 337.
[382] Shapin, *ShoT*, 103.

> information or true induction have been overlooked or incorrectly established, but that nature, like fortune, is long-haired at the front and bald at the back. It remains, therefore, for the matter to be attempted anew, and that with better help and with the zeal of opinions laid aside, so that we may enter into the kingdom of philosophy and the sciences (in which human power is situated, for nature is conquered only by obeying it) in the way that we gain access to the Kingdom of Heaven, which none may enter save in the likeness of a little child.[383]

Bacon not only holds the collective status quo accountable for the obstruction of natural truths, but, in fact, any status quo that has occurred in history. The only hope for the correction of such an ongoing epistemological disaster is that "the zeal of opinions" and all the gathered intellects of the age which compose the atmosphere of the collective, civil realm, be "laid aside."

4.4 A Matter of Trust

Leviathan and the Air-Pump (1985) and *A Social History of Truth* (1994) examine the collective identity and authority represented by the Protestant gentle class in England. The themes of both works thus extend from the Weber/Merton social-determinist theory of early modern pursuit of science in England.[384] However, in accordance with the Sociology of Scientific Knowledge (SSK) school of historiography, both Shapin and Schaffer, and especially Shapin in his later work, emphasise the role of social bonds, especially the bonds of *trust* and *communitarian belief*, as the cohesive substance not just of intra-class civility, but of the methodological and epistemological testimonies that inform objective perceptions and assessments of scientific reality. In *A Social History of Truth*, Shapin explains,

> [t]rust is, quite literally, the great civility. Mundane reason is the space across which trust plays. It provides a set of presuppositions about self, others, and the world which embed trust and which permit both consensus and civil dissensus to occur. A world-known-common is built up through acts of trust, and its properties are decided through the civil conversations of trusting individuals. The root of all civility and good manners is therefore the presumption of that basic perceptual competence and sincerity which provide warrants for our conversation as being reliably oriented towards and about the realities upon which we report.[385]

Shapin's argument grants reasonable, epistemological, and methodological authority to the *civil* sector of society. The very properties of the world are matters of civil conversations. What Bacon calls the "fruits" and "light" of inquiry are, in Shapin's model, conveyed on the shoulders of communitarian trust. Discoveries only receive their validity through the

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[383] Bacon, *OFB*, vol. 6, 7-9.
[384] See, in particular, Robert K Merton's *Science, Technology & Society in Seventeenth-Century England* (New York: Howard Fertig, 1970), especially Chapters IV-VI.
[385] Shapin, *ShoT*, 36.

collective sanction of consent and their acceptance as common knowledge according to the sensibilities of a particular social group. Only thus, he contends, can the "knowledge involved in trust" reveal its "provisional character and empirical component."[386] He explains,

> We can find that *this* [viz., a hypothetical] act of trusting was misplaced and, revising our working knowledge accordingly, the scheme of things upon which we reposed that routine trust can change, with the result that the next similar situation may yield a different truth.[387]

First, we note that Shapin identifies a fundamental relationship between working knowledge and the particular breed of trust shared by, in the case of *A Social History of Truth*, English gentlemen in the seventeenth century. Shapin describes a pre-existing system of social trust that would dictate terms to working knowledge. If or when that trust should be lost, no matter the reason, working knowledge, viz., "the scheme […] upon which we reposed that routine trust," must also change. Such a condition indicates that working knowledge is seen as deficient by the trusting community when that community's endowment of trust proves (to themselves) to have been misplaced. Bacon would reject this scenario as a step backward from even the obstructive logic of scholastic disputation, whose dialectical inclusion of that which might be "otherwise" dooms its epistemological and utilitarian value.

We are justified, then, to ask what, if not the fruits and light of a prior working knowledge, might cause the loss of this communitarian endowment of trust. Shapin has shown that this trust does not depend on working knowledge, rather the working knowledge depends on the system of trust. Bacon would consider this manifestly untenable. In his view, working knowledge must precede any judgment, and working knowledge can only follow discovery. There is no place at this point for communitarian trust. Bacon insists that there is a world as *it is* (or, to be exact, a "world as we actually find it").[388] The logical arguments on either side of a topic which seek to solicit collective trust equally obstruct true discovery and therefore veritably sabotage the potential for the accrual of working knowledge.

Bacon is adamant that undisciplined human sensibilities are not equipped to intuit, much less artfully dictate natural truths. We recall his warning that

> [t]he subtlety of nature far surpasses the subtlety of sense and intellect, so that all our choice meditations, speculations and controversies are mere madness, except there is no one there to tell us so.[389]

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[386] Shapin, *ShoT*, 37.
[387] Shapin, *ShoT*, 37.
[388] Bacon, *NO*, 187.
[389] Bacon, *NO*, 67.

Bacon argues that the human weaknesses embodied by the four species of Idols in the mind *inherently* impede the proper interpretation of natural truths. Thus, in the case of natural inquiry, even the self-disciplined practitioner cannot fully trust his own senses, much less the opinions or assessments of witnesses.[390] They can only deliver their discoveries to the supreme judge of time. In the milieu of witnesses, trust is readily persuaded or dissuaded, a regressive civil project of dialectics posing as epistemology. The value and validity of positive knowledge, Bacon argues, does not depend on its assent or approval from human authorities, much less their trust. Expressly demarcating rather than conjoining the respective epistemological realms of socio-politics and science, he asserts,

> Nor is Consent it self, nor the long continuation thereof, with such reverence be adored for however there may be many kindes of States in Civile Government; yet the State of Sciences is but one, which alwaies was, and so will continue, Populare, and with the People the Disciplines most in request are either Pugnacious and Polemical, or Specious and Frivolous; namely such as either illaqueate or allure the Assent.[391]

Here, Bacon warns against conducting scientific inquiry according to collective sensibilities. The public appetite is not for natural truth, but, in Bacon's opinion, for controversy and self-confirmation.

Bacon's mistrust of the collective runs parallel to his mistrust of empiricism and mere "method by enumeration," which he considers a methodological pretender to the construction of axioms.[392] He contends that human beings are inherently incapable of executing authority over nature's secrets. They may only consider themselves observers and scribes. The human authority in natural inquiry is manifest in the enduring integrity of an inquirer's axiomatic work and contribution to natural histories. Even then, that authority exists at the behest of time, nature, and axiom. Whether or not those axioms win the trust of the collective is, so to speak, immaterial. The axioms themselves can only be vindicated by time, future inquiry, and the voice of nature herself regarding the degree to which they describe natural truth. The only authority available to the human inquirer in this case is that which he is able to exercise over the goodness and moral fruits which begin with reason in his will. Goodness is not defined by trust, but as the faith toward and dedication to posterity.

Accordingly, Bacon, even if unwittingly, invokes one of the founding discourses of his Great Instauration in *Thoughts and Conclusions on the Interpretation of Nature or a Science Productive of Works* (or, *Cogitata et Visa*), published in 1607, two years after *The Advancement of Learning*. He plainly asserts that "[t]he human discoveries we now enjoy

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[390] See Daston, "Baconian Facts," 55.
[391] Bacon, *OAPL*, 9.
[392] Bacon, *NO*, 163.

should rank as quite imperfect and undeveloped [and that] in the present state of the sciences new discoveries can be expected only after the lapse of centuries."[393] The epistemology of natural philosophy must, in Bacon's scheme, start from scratch. In his model of natural interpretation and the acquisition of knowledge, human intellectual arbitration and the affectation of trust are not only to be removed, they are to be disqualified and the way laid exclusively for literate experience and the axiomatic interpretation of nature In Bacon's epistemology, there can be no axiomatic "otherwise," only what *is*, according to the axiom, that is, according to nature, again, "as we actually find it."[394] We revisit and extend the citation of Aphorism 84 from *Novum organum*:

> On the subject of authorities, it is the height of pusillanimity to attribute everything to them but to deny time its rights which the author of authors and indeed of all authority. For truth is rightly called the daughter not of authority but of time. Thus it is no wonder that the spell of antiquity, authorities, and consent has so manacled men's strength, that (as if bewitched) they have become incapable of familiarising themselves with the actual nature of things.[395]

Bacon conveys that the fallibility of collective authority lies in its communal reverence for antiquities, or, rather, the communal reverence for *tradition*. Tradition is the core supplier of communitarian beliefs, sensibilities, and, not least, civil trust. It is, Bacon charges, the cause of epistemological sclerosis. The inquirer must fully clear his mind (that is, his sense and intellect) of the dead weight of facile traditional knowledge by overwriting it with new discoveries. Thus, in the final paragraph of his early work, *The Masculine Birth of Time* (*Temporis Partus Masculus*, 1603, the same publication year as *A Confession of Faith*), Bacon passionately admonishes his hypothetical pupil:

> [M]y son, if I should ask you to grapple immediately with the bewildering complexities of experimental science before your mind has been purged of its idols beyond a peradventure you would promptly desert your leader. Nor, even if you wished to do so, could you rid yourself of idols by simply taking my advice without familiarising yourself with nature. On waxen tablets you cannot write anything new until you rub out the old. With the mind it is not so; there you cannot rub out the old till you have written in the new. Nay, though you might possibly divest yourself of the *idols of the inn*, there would be every fear of you falling victim to the *idols of the road*, unless you were prepared. You have become too accustomed to following a guide. At Rome, too, when tyranny was once in the saddle, the oath of allegiance to the Senate and the People became a vain thing. Take heart, then, my son, and give yourself to me so that I may restore you to yourself.[396]

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[393] Bacon, "Thoughts and Conclusions," 73.
[394] Bacon, *NO*, 187.
[395] Bacon, *NO*, 133.
[396] Francis Bacon, "The Masculine Birth of Time," in *The Philosophy of Francis Bacon: An Essay on its Development from 1603 to 1609 with New Translations of Fundamental Texts*, trans. Benjamin Farrington (Liverpool: Liverpool University Press, 1964), 72.

While this passage speaks clearly for itself, we note Bacon's early awareness of the Idols, those intractable pernicious influences that are instilled in each individual human mind by upbringing, education, cultural norms and traditions, and the demands of society at large. Bacon advocates for a new philosophy built not on prosaic empiricism but on the individual endeavour of moral self-discipline.

4.5 The Epistemological Surety of Literary Transmission

The collective aspect of Bacon's natural inquiry appears at a later stage when the individual experimenters share not just their discoveries, but their assessments on the value of those discoveries. Their submission to the community appears in the form of either the literate experience or the interpretive axioms they have assembled from their work. By this exercise, nature itself serves as both source of and witness to methodological, interpretive, and epistemological validity. The human inquirer at that point, as Bacon has suggested, is merely the scribe.[397]

Individual practitioners submit their discoveries both to collective scrutiny and to collective benefit in the form of either literate experience, which leads to further experiments, or axioms, which convey axiomatic natural truths which themselves lead to new experiments.[398] In short, the natural interpreter in Bacon's scheme submits his work to collective consideration according to the written record of his discoveries. This record orders and details every phase and idiosyncrasy of experiment – and experimenter – and presents axioms (should they arise) to both the casual reader and to the "sons of science." These experiences can only be submitted by the inquirer once the work of sensory-intellectual inquiry is done. To do otherwise, that is, to solicit or accommodate, out of a sense of epistemological and communitarian duty, the input or sanction of community witnesses regarding the actual work of natural interpretation is to compromise both the investigation and the subsequent transmission of knowledge. The sanctity of the mind-universe marriage must not be infringed upon. In *Cogitata et Visa* (*Thoughts and Conclusions*), Bacon elaborates:

> [t]he branches of knowledge we possess are presented with too much pretension and show. They are dressed up for the public view in such a way as to suggest that the individual arts are one and all perfected in every part and brought to their final development […] [y]et the most ancient searchers after truth, who were more reliable, preferred to compress into aphorisms or brief disconnected unmethodical sentences, the knowledge they had gathered from the observation of nature and thought worth preserving. This method of presentation was less misleading. It gave a bare outline of their discoveries and left obvious blanks where no discoveries had been made. *It was a stimulating method which made their readers think and judge for themselves*. But

[397] Bacon, *PA*, 260-261.
[398] See Bacon, *OAPL*, 226.

> nowadays the sciences are presented in such a way as to enslave belief instead of provoking criticism; the intervention of a blighting authority precludes fruitful research.[399]

One particularly telling aspect of this passage appears tangentially in its closing words. Here, in 1603, in the infancy of his Great Instauration, Bacon condemns the methodological obstructionist vanities of "blighting authorities." These authorities to whom he specifically refers in this tract are almost certainly scholastic scholars against whom he rails for their presumption of epistemological credibility through the useless art of disputation in the interpretation of natural truths.

However, in Bacon's contrasting juxtaposition of "blighting authorities" to the commendable "ancient searchers after truth," we are given a view to his ideal of proper natural interpretation. He emphasises the necessity of the ascetic human communicative relationship to nature; natural inquiry combines observation with thought and with contemplation. It does not affix to observation the obligation to solicit the consent of witnesses. He rejects the factors of "pretension and show" in the presentation of knowledge which, like some "device," solicits formal assent and approval in a literal or figurative court. In such cases, natural inquiry cannot help but recast as either audition or spectacle at the behest of an expectant public. Epistemological degradation is inevitable should an experiment be expected by the collective to produce quantifiable and qualifiable results. Thus, Bacon's intent is not merely to play objective sensory experiment against scholastic disputation, but to convey the necessity of a pure conversation between natural inquirer and nature through the literary record of literate experience and axiomatic natural interpretation.

4.6 The Baconian Authority of the Written Word: Natural Histories

If Bacon's epistemological model requires that the natural inquirer avoid the "expectancies" of the collective, we are correct to ask by which means natural truths may be verified, especially if not through the consent of communitarian witnesses. What entity or power in lieu of collective assent comprises the seat of authority in the assessment of axiomatic and useful natural truth? We have already encountered Bacon's contention that truth is the daughter of time, a contention which removes the assessment of truth from human authority. But how precisely do literate experience, useful knowledge, the light of natural inquiry, and axiom travel to the ends of charity and posterity if not through tradition and communitarian

[399] Bacon, "Thoughts and Conclusions," 75-76. Emphasis mine.

consent and testimony? By what vehicle do all truths – and untruths, in Bacon's precepts – combine in the end to produce what will be the useful knowledge for future generations?

Bacon's intent for the transmission of knowledge is most evident in his provisions for the content and purpose of the Natural Histories. First, in its most general form, Bacon divides history into two primary classes: History Natural and History Civil. Under the aegis of Natural History, "the achievements and deeds of nature are recounted," while Civil History recounts "those of men."[400] These repositories are to include the records of all phenomena that may be found, collected, and documented from history to date (this, of course, means that history, like inquiry itself, in its entirety is a perpetual project requiring perpetual contribution). They are to serve two distinct purposes relative to their respective aegises: one, "for the sake of knowledge of the very things assigned to history," and two, for the histories to serve "as the primary matter of philosophy."[401]

Leaving aside Civil History, Bacon divides the jurisdictions of the Natural Histories into three primary parts. The first is the history of Nature in its free state, or *Generations*.[402] The second is the history of nature "torn from its course by the crookedness and arrogance of matter," or *Pretergenerations*.[403] The third refers to the history of nature as "it is restrained and moulded by art and human agency," or *Arts, Mechanical and Experimental*.[404] Each of these contains numerous further and specific subdivisions.[405] Bacon conjoins the History of Generations and Pretergenerations, as they both concern nature in its free state, the latter specifically "prodigious" things in unbound nature (what he also calls "monsters").[406] Bacon considers the third division, the *History of Arts*, to be "the most useful […] because it displays things in motion and leads more directly to practice."[407]

In the manner of the dedicated natural philosopher embarking on a new endeavour of inquiry, Bacon pledges himself alone to the task of compiling the original histories, an assignment that he considers necessary for the foundations of his new philosophy. He explains, "I judge that I am in fact duty bound not to leave the composition of the required history to others but to take it upon myself – because the more this work seems like a thing open to everyone's industry, the greater my underlying fear that people will stray from my plan."[408]

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[400] Bacon, *OFB,* vol. 6, 99.
[401] Bacon, *OFB,* vol. 6, 105.
[402] Bacon, *PAH*, 455.
[403] Bacon, *PAH*, 455.
[404] Bacon, *PAH*, 455.
[405] See, for example, Bacon, *PAH*, 459-465.
[406] Bacon, *PAH,* 461.
[407] Bacon, *PAH*, 463.
[408] Bacon, *OFB,* vol. 6, 107-109.

Nonetheless, Bacon's actual plan of execution for the Natural Histories is amorphous. Jalobeanu has noted that "the diversity of [Bacon's] natural historical writings is considerable and often contradictory."[409] She continues, expressing the difficulty of knowing exactly what the histories should contain: "[i]n some places, *historia* is simply the equivalent of *experientia*."[410] The exact nature of what Bacon considers appropriate natural historical content is indeed unclear. Further, if he has assigned himself the duty for the composition of the first histories that will serve his project, he seems to take as read that such histories will be perpetually engaged by other authors. He advises "that those who take on the job of writing natural history in 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."[411] If the exact office of the natural historian here is a bit vague (is he the actual experimenter? is he a literary compiler? does he himself construct the axioms or only make note of those constructed by others? all of the above?), Bacon is unequivocal regarding the provision that the work of the authors is fundamentally thankless, that is, fundamentally *not* subject to communitarian expectancies.

However, we can take Bacon at his word regarding not only his *intent* for the Natural Histories, but for his programme at large regarding the literary transmission of knowledge. The Great Instauration is, in Bacon's view, to be perpetuated through the "sons of science." The sons of science prepare for their own experiments by becoming familiar with secondary sources (what Robert Boyle will identify as *mediate experience*) that precede them, that is, what, for them, will be the existing Natural Histories. The experience of experiment is to be drawn and recorded by the inquirer from both successes and failures, from both conclusive and inconclusive results. Bacon admonishes that Natural Histories should thus include not only what the inquirer can attest to be correct, but also what the inquirer deems questionable and false. The Histories should "comprise all things vile, illiberal, and repellent [… and] should also adopt things frivolous and childish […] things which seem to be far too subtle because in themselves they have no use."[412] As he qualifies in the *Parasceve*, "the things collected in this history are not set down for their own sake, and so their standing is not to be

[409] Dana Jalobeanu, "Francis Bacon's Natural History and the Senecan Natural Histories of Early Modern Europe," *Early Science and Medicine* 17 (2012): 199. https://doi-org.libproxy.york.ac.uk/10.1163/157338212X631846.
[410] Jalobeanu, "Senecan Natural Histories," 199.
[411] Bacon, *PAH*, 457.
[412] Bacon, *PAH*, 465

judged by their intrinsic worth but by how they can be adapted to other purposes, and fertilize the field of philosophy."[413]

Remaining with the *Parasceve*, Bacon delivers express prescriptions regarding the Natural Histories. His overarching vision extends beyond the prosaic content of the histories to the sublime purpose of natural inquiry and of the spirit in which practitioners should undertake it:

> Just as the subject of Natural History is threefold (as I said), so its use is twofold. For it is used either for the sake of knowledge of the actual things assigned to history, or as the primary matter of philosophy, and the basic stuff and raw material of true induction. And it is the latter end that we go for now – now, I say, for no one has gone for it before. For neither *Aristotle*, nor *Theophrastus*, nor *Dioscorides*, nor *Pliny*, and still less the *Moderns*, have ever set themselves the goal of which we speak for natural history. And the main thing is this: that those who take on the job of writing natural history in 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. For if they remember this, they themselves will determine the means of doing this kind of history. For the end governs the means.[414]

Bacon intends his Natural Histories, which are profoundly comprehensive, not to be mere repositories of experiential data. Of course, fruits and light of experiment do figure into the historical content.[415]

However, in Bacon's plan, such endeavours involving the particulars of experiment comprise two different areas of record which, as we have seen above, he joins under the aegis of the "Arts of Discovery."[416] The one part, *experientia literata*, or literate experience, pertains to the detailed literary record of an inquirer's experiment, the information of which can be used to stimulate new experiments.[417] Bacon refers to this literate experience as *Venatio Panis*, or the *Hunting of Pan*."[418] The implication that natural inquiry is analogous to an ongoing hunt is meant by Bacon to convey that the system of experiments in question has yet to yield axioms. Thus, literate experience refers to "ways of making [new] *Experiments*" in the pursuit of axioms. [419] *Interpretatio naturae* (the *interpretation of nature*), or, *Novum organum*, the second division of the Art of Discovery, refers to experiments that *do* proceed to axioms, and which themselves lead to new experiments which are based on those

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[413] Bacon, *PAH*, 465.
[414] Bacon, *PAH*, 455-457.
[415] For example, see Bacon's *Catalogue of Particular Histories*, *OFB*, vol. 11, 475 ff. There are, at that count, 130 particular histories in the list, all of which Bacon reports as yet to be written.
[416] Bacon, *OAPL*, 226.
[417] Bacon, *OAPL*, 226.
[418] Bacon, *OAPL*, 226.
[419] Bacon, *OAPL*, 226.

axioms.[420] Bacon describes the scheme of *interpretatio naturae* as the "*Transition of Experiments into Axioms; or of Axioms into Experiments*."[421]

If the authorship of, or contribution to, the natural histories remains abstractly implied by Bacon, the record of *experientia literata* and of *interpretatio naturae* represent a duty of labour on the part of the individual natural inquirers themselves. Such labours can be performed by no one else. Bacon notes that literate experience "is not properly to be taken for an *Art*, or a part of Philosophy, but a kind of *Sagacity*."[422] He thus remands the interpretation of experiment to the individual inquirer, even if the compilation of those written interpretations can be undertaken by second parties in the name of natural histories.

Such is the nature of experiment until the axioms born of *interpretatio naturae* have been formally submitted in writing to the sons of science. Were the same experiments, rather than committed to literary and interpretive experience by the inquirer himself, instead assessed and authorised by witnesses, the motive, meaning, and value of those experiments as first-hand experiences would be lost on the witnesses. The experience of knowledge, Bacon insists, must be recorded as literature by the practicing inquirer (whose husbanded goodness allows for that knowledge to survive the status quo and flourish in posterity).

Bacon's epistemological intent is that literate experience and the interpretation of nature – and especially, regarding the latter, axioms – compose the mode of transmission through which each individual natural inquirer endows the fruits and light of his work to posterity. In Bacon's project, it is not only discovery that is valuable to epistemology, but the *attempt* to discover. The process of the *Venatio Panis* is inherently valuable whether the quarry of axioms is captured or not. This is an aspect of natural inquiry for which communitarian witness-authorities are not equipped. Bacon emphasises that inquiry and knowledge only progress on the direct foundation of previous endeavours whether those endeavours yield discoveries or not. Otherwise, the progress of knowledge founders in an endless cycle of re-invention and forgetfulness. Bacon notes that "[t]he fountains of experience . . . have either been non-existent or extremely weak, nor has anyone sought out or harvested a forest of particulars and materials of a number, kind, or reliability in any way sufficient for informing the intellect."[423]

Natural Histories, literate experience, and interpretive axioms are to be received, supplemented and re-transmitted by experimenters in the same way the scriptures are done so

[420] Bacon, *OAPL*, 226.
[421] Bacon, *OAPL*, 226.
[422] Bacon, *OAPL*, 226.
[423] Bacon, *NO*, 155.

by ascetic scholars. Both inquirer and exegete must succeed in self-discipline regimens of piety, moral fortitude, and ascetic dedication. Bacon's Great Instauration seeks to supply humanity with the inquirers and authors who have, of their own volition and out of a duty to Man, nature, and God, mortified any temptation to court assent from the community.

In the following passage from the Seventh Book of *De augmentis*, Bacon effects a departure from Aristotle's *Nichomachaen Ethics*. Here, Bacon denounces not the *individual*, but the *inactive life*, while emphasising the importance of the *active*. His criticism of inactive contemplation is by no means tantamount to a criticism of *Self-good* on behalf of the *Good of Communion.* For Bacon, both represent basic appetites in Nature and cannot be separated.[424] However, in addition to Bacon's views on the active versus contemplative life, we are provided a context from which to consider *experientia literata*, *interpretatio naturae*, and, not least, natural histories. All of these belong, with natural inquiry, to the *vita activa*. Bacon writes,

> [M]en must know that in this Theatre of Mans life, it is reserved onely for God and Angels to be Lookers on. Neither surely could it have bin that any doubt, touching this point, should ever have bin rais'd in the Church […] but upon this defence, *that the Monasticall life is not simply Contemplative*; but is altogether conversant in *Ecclesiastique Duties*, such as are incessant Prayer; Sacrifices of Vowes performed to God; the writing also, in such great leasure, Theologicall Books for the propagation of the knowledge of the *Divine Law*, as *Moses* did when he abode so many daies in the *retir'd secresie of the Mount*.[425]

In this paradigm, Bacon assigns a crucial value to the interpretive works not only of individuals in general, but of individuals, as in the remarkable case of Moses, who, on "the Mount," wrote in "retir'd secrecsie." The important aspect in the Baconian view of this analogue is that dedicated individuals such as Moses, who have given themselves to a converse with God, *share* the fruits and light of their divine engagements.

Bacon implies to great effect that Moses, on the Mount, has arrived at the axiomatic stage of inquiry. He has bestowed his ten axioms (in incised written form) as the authoritative results of his own *interpretatio naturae*, or, rather in this case, his own *interpretatio divinae*. The truth of these axioms is not contingent on the pending consent of a community of witnesses. They have been submitted by their author only to posterity and the authority of time. Moses, in Bacon's view, is a model natural inquirer.

Moses has delivered to the political realm of the human collective what Bacon would doubtless agree were sublime axioms. The Ten Commandments are the manifest result of a close – and closed – conversation between individual inquirer and his subject. Moses has

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[424] See Bacon, *OAPL*, 337.
[425] Bacon, *OAPL*, 339.

submitted these axioms as he has "received" them. He was far removed from and not subject to the methodological or epistemological authority of witnesses or communitarian consent. The community in Moses' case can only consent to accept or reject the axiom/commandments, not judge them, and can exercise no authority of assent or dissent regarding the inherent *truth* of the axioms. That truth has been established by Moses through his own sense and intellect in a close converse with God. His tools of interpretation have been governed by the fertile goodness he has cultivated from the reason of his God-given human will. His actions have been guided by the moral virtue he has formed out of that goodness and instilled in his mind.

In his assignation of the (disciplined) sense and intellect as the mediate tools of experiments and experience (they are *not* to be confused with the authorities of natural truths), Bacon's scope transcends a methodology of induction marked by the rigid empirical inquiry applied to the end of objectively quantifiable results. Bacon reserves only criticism for "the *Empirical* family of philosophy."[426] He considers the intuition and judgement of the inquirer, as well as the errors and failures of inquiry, to be useful inclusions which facilitate the formation of new experiments and the arrival at inductive axioms. A collective of even the most astute witnesses is not equipped to abide such epistemological subtlety. Further, the expectancies born of communitarian beliefs require absolution, in the form of either success or failure of experiment. This condition cannot help but impose an obligation of perfection, again, in the success or failure of experiment (and so of experimenter). Thus, we must refute any accusation of Bacon's endorsement of an empiricist slavery to method. In *Novum organum*, he writes,

> People will no doubt think when they have read over this same history of ours and the tables of discovery, that there is something in those very experiments which is less than certain or downright wrong, and because of that they may imagine that my discoveries rest on false and doubtful foundations and principles. But this is of no account, for such things necessarily occur when we are starting off. For it is like in writing or printing where if one letter or other be misplaced or wrongly set, it does not generally get in the way of legibility very much, for such errors are easily put right by the context.[427]

Bacon elaborates on this assessment of axiomatic proof in the *Parasceve*. His confidence in the epistemological power of axioms to neutralise the errors of experiments and the shortcomings of the human sense and intellect is absolute.[428] The mediative power exercised

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[426] See Bacon, *NO*, 101.
[427] Bacon, *NO*, 177.
[428] Bacon is as ruthless in his caveats regarding sense as he is in his criticism of empiricism. In *Novum organum* he writes, "[B]y far the greatest hindrance and distraction of the human intellect stems from the dullness, inadequacy, and unreliability of the sense, so that things which strike the senses outweigh those which, even if they are more important, do not strike them immediately. Reflection therefore almost stops where sight does, so

over axioms by time, nature, and future inquiry allow for the entire experimental experience to be included as useful knowledge in the natural histories. For Bacon, natural truth will prevail whether it is believed, appreciated, accepted, or rejected by any human authority. To leave any pertinent aspect out of the literature of knowledge is to undermine the transmission of useful knowledge and, ultimately, to jeopardize the beneficence to humanity. He writes:

> As for the reliability of the materials taken into the natural history, they are of necessity wholly reliable, of doubtful reliability, or downright unreliable. Now the first sort should be put down plain; the second with a note, for instance with a phrase like *they say*, or *they report*, or *I have it on good authority*, and the like. For it would be very hard work to put down the arguments about reliability pro and contra, and they would doubt hold up the writer no end. Nor, for that matter, would it contribute much to the business in hand, because (as I said in *Aphorism 118 of Book I* [of *Novum organum*]) the truth of axioms will refute the falsehood of experiments, unless the latter swarm everywhere […] Lastly, there are things which are downright unreliable but which are bandied about and celebrated all the same – things of the kind which, partly from carelessness, and partly from figurative usage have flourished for ages […]; these should not be quietly set aside but be publicly proscribed lest they do any more damage to the sciences.[429]

The closing words of this passage reveal Bacon's universalist project of advancing both the fruits and philosophical light of experiment. These serve not only to empower Man in his discovery and husbandry of natural truths, but also as a means to reinforce new useful methods of natural inquiry in its own right. New approaches are to be used not only to secure axiomatic, useful truths, but as pedagogic weaponry against ineffectual traditions of inquiry and epistemology. Bacon asserts that scientific discoveries on their own which do not also produce advancements in learning are insufficient. As we glean from his language, it is up to the new individual practitioners to correct the unreliable things "bandied about" and "celebrated." These latter verbs reveal Bacon's impatience with the ineptitude and ulterior motive of collective consent by which authorities have presumed to qualify meaningful knowledge. There is nothing a lone inquirer devoted to the construction of axioms may bandy about or celebrate. Further, in all likelihood, that inquirer will not live to see the full fruition of the knowledge he has contributed. For Bacon, as we have seen in his exemplars of moral virtue, natural inquiry and the search for natural truths is virtually a sacrifice of the individual inquirer on behalf of humanity. However, in Bacon's scheme, the natural inquirer must write his own story and see to its transmission; he cannot die in vain.

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things invisible [i.e., not immediately and/or readily and conveniently apparent] attract little or no attention." (Bacon, *NO*, 87). For Bacon, natural inquiry can only prove of useful benefit if the inquirer is disciplined and diligent in the registry of both experimental success and error. Lorraine Daston points to Bacon's impatience with scholastic epistemology, which "had been empirical without being factual." Daston, "Baconian Facts," 44.

[429] Bacon, *PAH*, 467.

Bacon asserts that the Arts of Discovery are most effectively transmitted to the sons of science by the written word.[430] The literary recording of experiment is, itself, a continuation of the marriage of the individual inquirer's mind with the universe. Further, the reception of the literary experience of experiment by the sons of science serves as *their* entry into their own bride-chambers of mind and universe.[431] Thus, Bacon asserts that literature is the most appropriate vessel of the transmission and reception of useful knowledge. The construction, transmission, and reception of the literary record is itself a facet of self-disciplined individual inquiry which protects the integrity of natural knowledge. The role of the community in this scheme is to ensure that the literature of experimental experience is properly disseminated amongst its members. Man must not operate in opposition to nature as must be the case in the success of the collective. The story of human society is defined by the artistic endeavour to diminish Man's exposure and vulnerability to nature. The community is a device wherein its members are assured biological survival through the subjugation and destruction of nature. Thus, civil behaviour makes men efficient in the human removal from nature. Natural interpretation and natural inquiry must be the province of the individual, whose skill of efficiency should be developed on behalf of an unbroken marriage with nature and so with the interpretive substance of literate experience. Bacon explains,

> For in nothing else does the aspiration to deserve well show itself than if things are so arranged that people, freed both from the hobgoblins of belief and blindness of experiments, may enter into a more reliable and sound partnership with things by, as it were, a certain literate experience. For in this way the intellect is both set up in safety and in its best state, and it will besides be at the ready and then come upon harvests of useful things.[432]

Literature, itself the product of individual self-discipline, bears witness and serves as the axiomatic vessel of experimental and axiomatic knowledge. The validity of interpretation is proved by axioms which represent natural truth and which transcend the authority of consensus. Bacon warns that natural truths are vulnerable to manipulation by the appetite of collective beliefs, which must be *vindicated* by inquiry.

Bacon recognises a symbiosis between axiomatic literature and experiment. This special relationship is described in his division of "the *Interpretation of Nature* [into] two general departments: the first is to do with extracting and fetching up axioms from experience, the second with deriving and drawing down new experiments from axioms."[433] Bacon implies that literature, the medium of axiomatic transmission, like the sense and intellect of the

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[430] Bacon, *OAPL*, 226; for "sons of science," see *OAPL*, 272.
[431] Bacon, *OAPL*, 30.
[432] Bacon, *OFB*, vol. 6, 3.
[433] Bacon, *NO*, 215.

inquirer, must involve a work of self-discipline for the precise reason that it *cannot* rely on the authority of consensus. The epistemological hazards of undisciplined literature resemble those of the undisciplined intellect. However, it is self-discipline which separates the weapon of destruction from the tool of true knowledge. As such, the proper use of literature is second only in importance to the proper use of the sense and intellect. Bacon writes:

> As for the [extracting and fetching up axioms], 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. [434]

Bacon deems the transmitting power of literature as crucial not just to the transmission of knowledge, but to discovery itself. Such literary vessels as the natural and experimental histories represent both a help and a healthy constraint on the intellect. They facilitate what Bacon calls "*the tribunal of the intellect*"; this tribunal is comprised of "the ministration to sense, the ministration to memory, and the ministration to mind or reason."[435] He notes that the histories themselves, like the intellect that they help, require constraint, since they "[are] so various and scattered."[436] To this, Bacon proposes the construction of tables wherein the vast amount of information can be ordered and thus serve the intellect.

Bacon deems his own methodological solitude as necessary for the proper construction of his philosophical precepts. Bacon views his literary project of the Great Instauration as a form of operative natural philosophy. He describes the vicissitudes of his authorship and literary experience as resembling those of the natural inquirer. He includes himself amongst those in need of preparation for the rigours of self-disciplined and self-sustained inquiry. Bacon confesses to his intimidation as he pledges his courage concerning the task he has set before himself. He demonstrates by his own example how the inquirer must summon his own fortitude – one of the moral virtues – since there is no other individual or collective that can supply him with it. He writes,

> *while this may seem to be an endless task from the outset, and beyond the power of mere mortals, yet when taken in hand, it may be found to be more reasonable and moderate than those proposals acted hitherto. For this matter can come to a conclusion whereas the proposals already implemented in the sciences leave men forever spinning in dizzying circles. Nor did he* [Bacon, referring to himself in the third person] *fail to see that this experiment of his might be a solitary undertaking, and desperately difficult it may be to get others to put their trust in it. Yet did he not think to fail it or himself but determined to try and set out on the only way open to the human mind.* [437]

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[434] Bacon, *NO*, 215.
[435] Bacon, *NO*, 215-216.
[436] Bacon, *NO*, 215.
[437] Bacon, *NO*, 3-5.

The literature of experiment makes possible the rectification of mistakes and erroneous conclusions which are inevitable in inquiry. Experimental failure is not terminal in Bacon's project. The histories are built of the very things that would be deemed unsound and invalid – or disgusting and puerile – by a convention of multiple witnesses. In the *Parasceve* Bacon lists his prescribed material of natural history. It must contain,

> matters so commonplace that people would imagine that, as everyone knows about them, it would be pointless to write them down. […] it should comprise things vile, illiberal, and repellent (*for to the pure all things are pure* and, if money extracted from piss smelt sweet, so much more does light and information wherever it comes from). […] it should also adopt things frivolous and childish (and no wonder as we must become again quite childlike); and lastly, things which seem to be far too subtle because in themselves they have no use. For […] the things collected in this history are not set down for their own sake, and so their standing is not to be judged by their intrinsic worth but by how they can be adapted to other purposes, and fertilize the field of philosophy. [438]

The common thread which binds the above inclusions is that they all find their place in the realm of experiment by the independent assessment and placement of the individual inquirer. Bacon attacks a general public benumbed with popular opinion and obsessed with monsters and rarities in the realm of the sciences. He proposes a mode of inquiry that deals with those objects and phenomena which the witnessing community, preferring to be entertained with anomalies, cannot recognise as being inquiry-worthy for the plainness of the included particulars. Bacon realises that the greater the monster, the more generous the collective is with its enthusiastic consent. Thus, of even greater importance in Bacon's view is the inquiry undertaken by those throughout history who have not sought assent or fame, who have made mundane particulars the substance of inquiry, and who have managed to submit their truths to the judgment of time alone:

> And if any stand upon Consent now inveterate as the Judgement, and test of Time, let him know he builds upon a very deceivable and infirm Foundation. Nor is it, for most part so revealed unto us what in Arts and Science hath bin discovered and brought to light in diverse ages, and in different regions of the world, much lesse what hath bin experimented, and seriously laboured by particular Persons in private. For neither the Birthes, nor the Abortions of Time have bin Registred. Nor is Consent it self, nor the long continuation thereof, with such reverence be adored for however there may be many kindes of States in Civile Government; yet the State of Sciences is but one, which always was, and so will continue, Populare, and with the People the Disciplines most in request are either Pugnacious and Polemical, or Specious and Frivolous; namely such as either illaqueate or allure the Assent.[439]

[438] Bacon, *PAH*, 465.
[439] Bacon, *OAPL*, 8-9.

It is the serious labour of private persons that provides for the useful contributions to posterity. Left to popular assessment, the inquiry into nature becomes a frivolous discipline, a conceit of the political present governed by infertile pugnacious polemics.

In the *Parasceve*, amongst the "certain extra useful features which can make [the natural history] better adapted and suited to the work of the *Interpreter* which succeeds it," Bacon provides one particular item amongst the five listed which calls for a written (not demonstrated) description of "the way of performing [any new or more subtle experiment] […] so that people will be free to make up their minds whether it is trustworthy or not."[440] This is not a call to or endorsement of collective assessment. It only suggests that the reception of the literature of natural and experimental history composed by individual authors should indeed inform the community. However, that information is made available to all in a given society for their edification, not their discretion. Even in the receptive sharing of the literate experience, each individual recipient must still engage the "history" put before him in his own solitude before any convention could occur. Bacon prescribes an individual engagement with the histories that mirrors the closed conversation between inquirer and nature, or between penitent and God. The sins and errors in the saga of inquiry are to be recorded with the virtues and vindications otherwise the work is incomplete. He propounds that

> [i]f there is anything in any narration which is doubtful or worrying, I would not at all want it to be suppressed or kept quiet but to be put in writing plainly and clearly by way of a note or advice. For I want this primary history to be written up with the most religious care, as if the truth of every single detail had been given under oath, since this is the book of God's works and (insofar as we can compare the Majesty of divine things with the insignificance of mortal) another kind of Holy Writ. [441]

Two salient aspects illuminate Bacon's passage. One, that the human engagement with mundane earthly particulars may be seen as a direct engagement with the works of God. Thus, the refusal to be concerned with any but the most spectacular and monstrous phenomena is tantamount to Man subjecting God to an audition to be judged as if He were a low performer. Two, the sanctified channel of transmission for the "primary history" has the same authoritative form as that which supplies the Scriptures: the written word. The word, immediately upon its stamp on the page, becomes, as Bacon considers his own work, "*more as the birth of time rather than of talent*."[442] Thus, Bacon deems the literary record and its transmission essential to his project. He stipulates that "no discovery should be sanctioned

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[440] Bacon, *PAH,* 469.
[441] Bacon, *OAPL,* 469.
[442] Bacon, *NO,* 7.

save that it be put in writing. Only when that becomes standard practise, with experience at last becoming literate, should we hope for better things."[443]

4.7 Conclusion

Bacon's Great Instauration is motivated by his sense of urgency that Man consider it his duty to interpret and manipulate nature to the ends of human beneficence. The interpretation of nature leads through natural inquiry to the creation of useful works and the advancement of knowledge. Man must unlock the hidden potential of nature through artificial experiment in order to bestow beneficent fruits and lights on humankind. To that end, individuals who intend to give themselves to the rigours of natural inquiry and thus intend to act on behalf of humanity at large, must abnegate the paths of traditional beliefs which are reinforced by the false authority of collective consensus. Idols and communitarian beliefs encourage the impulse to seek convenience, which encourages the corruption of inquisitional motivation. The desire for convenience has, Bacon alleges, led humanity to its own calamity as he has been consistently led down paths which steer him away from his duty to unlock the potential of nature. Bacon's admonitions against the epistemological authority of collective consent and communitarian beliefs thus stem from his fundamental mistrust of the human mind.

Since inquiry is to be undertaken only by those who have submitted themselves to Bacon's regimen of self-discipline and independent agency, the collective role in Bacon's interpretation of nature can only be an intrusion. The harnessing of both experiential and moral potential, which are crucial to Bacon's project, are beyond the abilities of the collective, whether in the assembly of meaningful experiments or the assessment and assent to the validity of interpretive inquiry. Bacon disqualifies the role of either witness or multiple witnesses as authorities of assessment in the methodological process. Witnessing is tantamount to transitory hieroglyphics, or the attempt to employ the memory in the absence of a written record. Since witnesses and the authority of collective consent do not qualify in the assessment of Baconian natural and experimental philosophy, the work of the inquirer and the history of the inquiry are to be recorded and transmitted as literate experience. Through literate experience, which includes the Natural and Experimental Histories, both the successes and failures of inquiry are to be submitted to posterity. It is through the posterior consultation with the written histories that new experiments arise and vindicate the work of previous inquiries whether or not those inquiries produced axiomatic truths. In this way, Bacon remands the authority of assessment ultimately to Time. If the self-discipline of the inquirer

[443] Bacon, *NO*, 159.

and his integrity of method are sound, the truth will out amidst the confluence of natural history, experimental record, and further posterior inquiry as occur over time.

For Bacon, there is a direct and fundamental working relationship between natural history (that which has been gathered in the past and entered into the cleansing medium of literate experience) and posterity. The pursuit of inquiry thus requires the stringent regimen prescribed by Bacon not only to ensure proper methodology, but also to ensure that the works and literate experience are properly transmitted by the inquirer to posterity. That which occurs as an action in and of the present is itself meaningless – *useless* – until it achieves its substantial form as *history* and effective form in posterity. Bacon propounds that the literate experience engendered by natural histories is the useful "substance" in the process of natural inquiry. It is only when human sensory experience, whether in the execution of experiment or the act of witnessing the experiment, is assessed in retrospect through the posterior reception of the literate experience that it becomes qualifiable and amenable to correction. In this case, the authority of witnesses is lacking in substance because witnessing it is an ephemeral action of the present. Bacon might offer that the usefulness of witnesses in an experiment could only be proved if the witnesses themselves were the inquirers executing an experiment about witnessing. However, only in their literary contributions to posterity would this hypothetical experiment acquire any value.

Chapter 5: The Hartlib Circle and Moral Utility

5.1 Foreigners

This chapter examines the degree to which Bacon's philosophy exerted influence on Samuel Hartlib (1600-1662), John Dury (1596-1680), and Jan Amos Comenius (1592-1670) in their individual and collective pursuits as members of the so-called Hartlib Circle beginning in the late 1620s. Howard Hotson acknowledges that "these 'three foreigners' [Hartlib, Dury, and Comenius] and their efforts for the advancement of learning are commonly credited with a key role in the spread of Baconianism in England, eventually institutionalized in the Royal Society of London."[444] Importantly, Hotson points out that, "[l]ike [Johann Heinrich] Alsted . . . Hartlib, Dury, and Comenius were all displaced in the late 1620s by warfare which swept through central Europe during the previous few years," and that "they were assisted . . . by correspondence and collaboration with a far larger body of displaced central European refugee intellectuals."[445] Thus, I find it significant that "the foreigners" Hartlib and his associates, who, on one hand, were not inclined to scientific inquiry per se, and on the other, were individuals without class status or class influence whose epistemological endeavours were entirely self-driven, saw fit to appropriate Bacon's philosophy as the utilitarian foundation of their own reformist (and Protestant) endeavours. In the example of the Hartlib Circle, we find that Bacon's precepts for the revision of the human intellect and the human soul, more than his advice directed toward the improvement of scientific methodology, defined his active legacy.

I find that, in particular, Samuel Hartlib and John Dury were amongst the first noteworthy individuals to adopt and promote Bacon's philosophy beginning in the 1620s. Later evidence shows that they, in concert with Comenius, were particularly drawn to Bacon's *De dignitate et augmentis scientiarum* (1623), specifically the 1640 translation of that work

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[444] Howard Hotson, *The Reformation of Common Learning: Post-Ramist Method and the Reception of the New Philosophy, 1618-c.1670*, (Oxford: Oxford University Press, 2020), 204-205.

[445] Hotson, *The Reformation of Common Learning*, 204-205. Also, for elucidating scholarship on the lives, works, and correspondences of John Dury, his wife Dorothy (née Moore), Hartlib, Comenius, and, not least, Robert Boyle's sister Lady Ranelagh especially as all experienced alienation, exile, and displacement during the Thirty Years War and Irish Uprising of 1641, see Michele Dimeo, *Lady Ranelagh*: *The Incomparable Life of Robert Boyle's Sister* (Chicago: The University of Chicago Press, 2021); Carol Pal, *Republic of Women*: *Rethinking the Republic of Letters in the Seventeenth Century*, (Cambridge: Cambridge University Press, 2012); Dorothy Moore, *The Letters of Dorothy Moore, 1612-64*: *The Friendships, Marriage, and Intellectual life of a Seventeenth-Century Woman*, ed. Lynette Hunter (Aldershot: Ashgate Publishing Limited, 2004). Carol Pal examines the plights and triumphs of exile attending the Bohemian royal family in the Netherlands in the early 1630s. John Dury and Dorothy Moore would meet in this environment. Moore, specifically, would appeal to Lady Ranelagh for assistance both for herself and the Bohemian royals. Bacon's philosophy was a primary unifying agent in the disparate circumstances of all listed above.

into English by Gilbert Wats titled *On the Advancement and Proficience of Learning*. Charles Webster has noted that Gilbert Wats' 1640 English translation of *De augmentis* "was thought particularly significant by Comenius."[446] However, for whatever measurable influence Comenius's enthusiasm for *De augmentis* might have had on Hartlib and Dury, as we shall see below, both latter individuals appear well-acquainted with that and other of Bacon's works over a decade prior to the publication of the Wats' 1640 edition. As this chapter focuses on the work and correspondence of John Dury and Samuel Hartlib, it searches for evidence of Wats' translation of *De augmentis* and other of Bacon's works. We find that Hartlib occupies a prominent place in the early transmission of Bacon's philosophy throughout the 1630s and 1640s, as evidenced in the correspondence of the former. Comenius himself most likely owed his own formative acquaintance with Bacon to the efforts of Samuel Hartlib.[447]

In their Introduction to *Samuel Hartlib and Universal Reformation*, authors Mark Greengrass, Michael Leslie, and Timothy Raylor quote seventeenth-century pansophist and educational reformist Comenius's reference to education as being like a "living tree, with living roots, and living fruits of all the Arts, and Sciences."[448] In so doing, the three authors credit Comenius as possessing the gift of "extraordinary metaphor."[449] What the authors do not mention is that they have likely found Comenius himself borrowing the imagery of either or both René Descartes (1596-1650) and Bacon.[450] Amongst his numerous literary

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[446] Charles Webster, "Introduction," *Samuel Hartlib and the Advancement of Learning*, ed. Charles Webster. (Cambridge: At the University Press, 1970), 32.

[447] See G. H. Turnbull, *HDC*, 342; also see *HP*, 44/1/2A-B, dhi.ac.uk/hartlib/context.

[448] Mark Greengrass, Michael Leslie, and Timothy Raylor, "Introduction," in *Samuel Hartlib and Universal Reformation: Studies in Intellectual Communication*, eds. Mark Greengrass, Michael Leslie, and Timothy Raylor (Cambridge: Cambridge University Press, 1994), 4; See also, Johann Amos Comenius, 1592-1670. *A Reformation of Schooles Designed in Two Excellent Treatises, the First Whereof Summarily Sheweth, the Great Necessity of a Generall Reformation of Common Learning : What Grounds of Hope there are for such a Reformation : How it may be Brought to Passe : The Second Answers Certain Objections Ordinarily made Against such Undertakings, and Describes the Severall Parts and Titles of Workes which are Shortly to Follow / Written ... in Latine by ... John Amos Comenius ... ; and Now ... Translated into English ... by Samuel Hartlib* .. [Pansophiae prodromus]. (London: 1642), 24. https://www.proquest.com/books/reformation-schooles-designed-two-excellent/docview/2240872567/se-2.

[449] Greengrass, Leslie, and Raylor, "Introduction," 4.

[450] For further discussion of Descartes' Tree of Knowledge, see Roger Ariew, "Descartes and the Tree of Knowledge," *Synthese* 92, no. 1 (July 1992): 101-116. https://www.jstor.org/stable/20117041. As far as exactly who Comenius may have been attempting to salute, I find it worthwhile to note that the intellectual relationship between the united trio of Hartlib, Dury, and Comenius and the philosophy of Descartes may have been more inimical than many scholars have allowed. Leigh T. I. Penman writes, "Hartlib's own opinion of Descartes seems to have been decidedly negative . . . [.] In the 1630s and 1640s, Descartes had provided negative assessments of the projects of two of Hartlib's closest allies [viz., Dury and Comenius]. Hartlib in turn dismissed Descartes: 'Hee also is too much bragging. For hee promises more in his general discourse than he does perform.'" Leigh T. I. Penman, "Samuel Hartlib on the Death of Descartes: A Rediscovered Letter to Henry More," *Notes and Records of the Royal Society of London* 69, no. 4 (20 December 2015):s 363-364. Hartlib's letter: *Ephemerides*, 1639, Part 3, Hartlib, *HP* 30/4/18B. https://www.dhi.ac.uk/hartlib/view?shelf=30%2F4%2F18.

idiosyncrasies, the latter remains one of the great artists of metaphor in the history of natural philosophy.

However, before we discuss Bacon's similar literary invocations, we may insert an intervening analysis of Comenius' metaphor. It would appear that, in the instance recorded above, Comenius is likely referencing René Descartes' famous metaphor from the "Author's Note" of his (Descartes') *Principles of Philosophy* (1644). It reads,

> philosophy as a whole is like a tree whose roots are metaphysics, whose trunk is physics, and whose branches, which issue from this trunk, are all the others sciences. These reduce themselves to three principal ones, viz., medicine, mechanics, and morals – I mean the highest and most perfect moral science which, Presupposing a complete knowledge of the other sciences, is the last degree of wisdom.[451]

Principles of Philosophy was first published in Latin in 1644 and so was roughly contemporaneous with Wats' *Of the Advancement and Proficience of Learning* (1640). Further, Dury's *A Motion Tending to the Publick Good* had been published (by Hartlib) in 1642 and *Considerations Tending to the Happy Accomplishment of Englands Reformation in Church and State* would be published in 1647 by Hartlib and Dury. Thus, Descartes' famous metaphor was indeed likely to have been a ubiquitous discussion point amongst the Hartlib Circle (which included Comenius) at the time it appeared.

However, the crucial point for the present analysis regarding *Principles of Philosophy* is that it is published twenty-one years after Bacon's original Latin publication of *De augmentis*. Thus, as we examine Descartes' precise metaphorical image not only of the tree itself, but the specific metaphorical functions of its trunk, roots, and branches, we cannot help but recognise a striking similarity to more than one instance of Bacon employing the same device.[452] We might refer to, for example, the Second Book of *De augmentis*, in which Bacon writes, "[f]or if you will have a Tree bear more fruit than it hath used to doe, it is not any thing you can do to the boughs, but it is the stirring of the earth about the root, and the application a new mould, or you doe nothing."[453] Later, in the Sixth Book of *De augmentis*, Bacon advises, "[i]f you have sciences grow, you need not much care about the body of the tree; only look well to this, that the roots be taken up uninjured, and with a little earth adhering to them."[454]

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[451] René Descartes, *The Philosophical Works of Descartes*, trans. Elizabeth S. Haldane and G.R.T. Ross (New York: Dover Publications, 1955), 211.

[452] Paolo Rossi notes that Bacon, Descartes, and Comenius cannot be called unique or radical for their respective invocations of "the Llullian image of the tree of sciences." However, we must note the graphic innovation presented by Bacon and taken up by Descartes regarding the branches of sciences which, interestingly in Bacon's words, do not so much as sprout from one trunk as *return* from their various ends and *meet* in one trunk. Such an image is meant by Bacon to be a symbol of inductive epistemology. Paolo Rossi, *Logic and the Art of Memory*, trans. Stephen Clucas (London: The Athlone Press, 2000), 37 ff.

[453] Bacon, *OAPL*, 71.

[454] Bacon, *OAPL*, 450.

However, in the Third Book, Bacon provides one of his most pointed dendrological metaphors. If we closely compare Descartes' text above with Bacon's directly below, we not only find evidence that it is Descartes who appears to have made reference to Bacon, but that the former likely and consciously made reference to this very text of the latter. Bacon writes,

> because the Partition of Sciences are not like severall lines that meet in one angle; but rather like branches of trees that meet in one stemme [trunk], which stemme for some dimension and space is entire and continued, before it break, and part it selfe into armes and boughes; therefore the nature of the subject requires, before we pursue the parts of the former distribution, to erect and constitute *one universall Science*, which may be the *mother* [italics mine] of the rest.[455]

Bacon builds his prescriptions for the reformation of natural philosophy, artificial inquiry, and the advancement of knowledge deliberately upon such metaphor and imagery. In his works Bacon preferred to cite fables and invoke the imagery of Greco-Roman myth rather than mathematical or empirical data. This use of fable and metaphor embodies Bacon's method of engaging the full experience of the (disciplined) human intellect to the end of understanding, and of contextualising the substance of extant natural histories. He praises the authors of antiquity who had employed – and had the knowledge to employ – these invaluable methods, lauding those such as Pliny the Elder, "who alone comprehended *Naturall History* according to the dignity thereof."[456] Even though Bacon qualifies his encomium, alleging that even Pliny "hath not handled as was meet, nay rather foulely abused," he does not impugn the ancients' acumen in understanding the paradoxical implement of metaphor to explain the non-abstract, multifarious phenomena contained in their natural histories.[457]

It is precisely this diverse approach to natural philosophy and learning that impresses Dury, Hartlib, and Comenius as they respectively responded to and applied (and sometimes rejected) Bacon's precepts to their own initiative of educational and ecumenical reform. It is Bacon's metaphorical imagery that, to a great extent, allows us to identify Bacon's influence on these individuals. Indeed, as this chapter serves as a prelude to Chapter 6, we will find that the signature language of Baconian inquiry is evident in the early work of Robert Boyle.

5.2 The Early Baconians: John Dury and Samuel Hartlib

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[455] Bacon, *OAPL*, 132. Interestingly, Rose-Mary Sargent illustrates the "epistemological divergence between Bacon and Descartes" as represented by Descartes' metaphorical preference of the tree and Bacon's choice of the pyramid as an image more apposite to his purposes. I would point out that, in the great scope of Bacon's work, he employs myriad metaphorical devices: the tree, the pyramid, the labyrinth, pools, waterfalls, and so forth. See Rose-Mary Sargent, *The Diffident Naturalist: Robert Boyle and the Philosophy of Experiment* (Chicago: University of Chicago Press, 1995), 31 ff.
[456] Bacon, *OAPL*, 80.
[457] Bacon, *OAPL*, 80-81.

5.2.1 Hartlib and Dury: Indirect Correspondence

The transmission of Bacon's philosophy was catalysed by vicissitudes of events within the wider scope of both European and English socio-politics. The Thirty Years War began in 1618, two years before the publication of Bacon's *Novum organum*. First sparked in the Bohemian province of the Holy Roman Empire, it would embroil all of Germanic Europe until 1648. While England, along with the Netherlands, served as a destination for refugees and exiled officials, royal and otherwise, during that period, it would undergo its own political cataclysm through the entire decade of the 1640s which would cause repercussions through the next decade as well. Both the war in Europe and the civil conflict in England in the 1640s were underscored by ecclesiastical discord. The Thirty Years War and the English Civil Wars were characterised by undercurrents not only of friction between Protestants and Catholics (or, as the case was in Europe, the strange alliances between those camps), but of that between Protestant sects as well. It is in this environment of upheaval that Bacon's philosophy finds its early most ardent adherents, Hartlib and Dury prominent among them.

During the late 1620s, Scottish idealist and irenicist John Dury saw cause and opportunity to devote himself to an ecumenical project to unite the Protestant sects of Europe. This project also included a "toleration" of Jews, though, as Jeremy Fradkin points out, with qualification, such as Dury's "recommend[ation] that Jews [in England] be required to listen to Christian sermons" and that "[t]he state . . . must constrain Jewish liberty so as to protect the English from blasphemy, financial domination, and oppression."[458] Dury indeed considered England to occupy a unique position of arbitration as an impartial, though, crucially, Protestant country. It was removed from the continental war, possessed of an accessible parliamentary government, and, not least, endowed with its own Protestant identity. Anthony Milton affirms that Dury believed that "the Church of England […] had a special role to play in his schemes for Protestant unity between Calvinists and Lutherans."[459] The ecclesiastical peace between Protestant sects was essential to the peace of Europe, and so to the peace of humanity, in Dury's mind. He considered the Church of England to be the fount of irenic and ecumenical advancement and non-partisanship in the ecclesiastico-socio-political arena.

Bacon's precepts provided Dury with a way to connect his theo-philosophical principles to his active pursuits of human improvement in real political terms. Dury, as Steve

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[458] Jeremy Fradkin, "Protestant Unity and Anti-Catholicism," *Journal of British Studies* 56, no. 2 (April 2017): 288.

[459] Anthony Milton, "'The Unchanged Peacemaker' […]" in *Samuel Hartlib and Universal Reformation: Studies in Intellectual Communication*, eds. Mark Greengrass, Michael Leslie, and Timothy Raylor (Cambridge: Cambridge University Press, 1994), 97.

Murdoch notes, by trade and faith a Scottish minister raised as a "strict Presbyterian," was nonetheless "not confined by [this] upbringing, and saw the futility of the insistence of fundamentalist dogma which kept the various Protestant denominations apart."[460] While Dury pursued his irenic mission on full behalf of the Protestant cause, he likewise (as we shall see below) considered himself in service of practicality as much as in service of Protestant scripture.[461] Bacon's Great Instauration provided the means for the new actors such as Dury to join individual moral *ideas* with the collective civil *deeds*. Dury, and Hartlib as well, found in Bacon's philosophy the epistemological template to effect practical means to the ends of ecumenical reconciliation. Bacon himself has advised that individual moral virtue might compromise the ugly but necessary business of political operations and thus should be kept at a remove from the civil theatre. By the 1630s, Dury will find this separation problematic. His solution is to apply Bacon's precepts regarding the active good and moral virtue inherent in the human individual to civil issues.

Dury was born in Scotland in 1596, but left with the rest of his family when his father Robert was condemned and banished in 1606. He thus received his education in Europe.[462] He would become known for his Presbyterian irenicism and Protestant ecumenicism, activist pursuits which were not uncommon amongst Scottish clergy in the late-sixteenth and early-seventeenth centuries. In the mid-1620s, he became minister to the Presbyterian congregation of the English Company of Merchant Adventurers in Elbing, Poland, Samuel Hartlib's birthplace. Turnbull and other authors such as Donald Dickson place Dury's period of ministry at Elbing between 1625 and 1630.[463] It was there that "he made three of the most important contacts of his life": Thomas Roe, Samuel Hartlib, and Jan Amos Comenius.[464]

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[460] Steve Murdoch, *Network North*: *Scottish Kin, Commercial and Covert Associations in Northern Europe, 1603-1746* (Leiden: Koninklijke Brill NV, 2006), 281.

[461] Pierre-Oliviet Lechot relates an assessment of John Dury by John Sym, a close associate of Hartlib, given upon Syms' engagement with Dury's "treatises" c. 1637: "John Sym, un proche d'Hartlib, avait eu accès aux traités rédigés par Dury durant cette période – et le moins que l'on puisse dire, c'est que son avis était plutôt mitigé. Outre qu'il [Dury] mélangeait trop hardiment tous les modèles possibles de théologie (ce qui, aux yeux de Sym, le rapprochait de Bacon!), Dury laissait également trop de place à la logique dans sa réflexion et, surtout, proposait un trop grand nombre de degrés dans sa distinction des types d'articles de foi." [John Sym, close to Hartlib, had access to the treatises written by Dury during this period - and the least we can say is that his opinion was rather mixed. Besides the fact that he [Dury] too boldly mixed all the possible models of theology (which, in Sym's eyes, brought him closer to Bacon!), Dury also left too much room for logic in his thinking and, above all, proposed too many degrees in his distinction between types of articles of faith.] Pierre-Oliviet Lechot, *Un christianisme «sans partialité»: Irénisme et méthode chez John Dury (v. 1600-1680)* (Paris: Honoré Champion Éditeur, 2011), 321.

[462] *ODNB*, s.v. "Durie, Robert (1555-1616)," by Richard L. Greaves, 2004, https://doi-org.libproxy.york.ac.uk/10.1093/ref:odnb/8324.

[463] Turnbull, *HDC*, 128. See Donald R. Dickson, *The Tessera of Antilia: Utopian Brotherhoods & Secret Societies in the Early Seventeenth Century* (Leiden: Brill, 1998), 124.

[464] *ODNB*, s.v. "Durie [Dury], John (1596-1680)," by John T. Young, 2019, https://doi-org.libproxy.york.ac.uk/10.1093/ref:odnb/8323.s

In the case of Hartlib and Dury, it is difficult to establish who made first contact with whom. We can safely presume that their association had begun, at latest, by 1628. In a letter dated 10 February of that year, Dury's name appears in the correspondence between Hartlib and Johann Fridwald. Fridwald had been directly involved in the utopian *Antilia* group helmed by Johann Abraham Pömer (1604-1687), which had grown out of the university in Rostock. At the time of Fridwald's and Dury's meeting, Dury was secretary to James Spens (English ambassador to Sweden) and minister to the aforementioned Merchant Adventurers in Elbing.[465] Fridwald, himself a native of Elbing, had had a life-long acquaintance with Hartlib and Hartlib's brother Georg. Fridwald personally mediated correspondence between Hartlib and Pömer prior to Hartlib's association with Dury. It is in the correspondence between Hartlib and Fridwald on 10 February 1628 that we find early echoic references to Bacon and his philosophy. Interestingly, these references appear to originate with Dury rather than Hartlib.[466]

Fridwald writes,

> Das der H. [Hartlib] auch an den Englischen Prediger [this would be Dury] gerathen, vnd teglichen viell herliche vnd sonderliche sachen von ihm erfehret, deszgleichen nicht viell gehöret, wie der H. schreibt, ist mihr herzlich lieb zuvernehmen gewesen, sonderlich weill selbige dieses löbliche werck mercklich befordern sollen [presumably Antilia]. […] Was denn dieselbe fur eigentliche sachen sein mögen, so der herr vom Englischen Prediger erfahren, ob ich schon coniecturire, das es vielleicht ausz desz Robert Fludden oder Baconis cerebro gesponnen so bitte ich doch mihr ein wenig derselben andeutumg zu thuen. [That H. [Hartlib] also came across the English preacher [this would be Dury] and learned many wonderful and strange things from him every day of which not much is known, as H. has written, I was very pleased to hear, especially because they would significantly encourage this laudable work [presumably Antilia] […] Whatever these actual things may be, if the gentleman should hear more from the English preacher, which I already suspect may be spun from the brain of Robert Fludd or Bacon, I would ask that you give me a little hint of the same.] [467]

Turnbull informs us that Fridwald, in the letter above, makes reference to a previous letter from Hartlib dated 28 December 1627. According to Turnbull's assessment, "Fridwald notes … that Hartlib has taken advice from the English preacher and has experienced daily many splendid and wonderful things from him which [as is denoted in unquoted text] will promote the praiseworthy work of Antilia."[468] However, what is of particular interest to my thesis, not least given the subject of Antilia, is that Fridwald, as Turnbull notes, has "conjecture[d] to

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[465] *ODNB*, s.v. "Durie [Dury], John (1596-1680)," by John T. Young, 2019, https://doi-org.libproxy.york.ac.uk/10.1093/ref:odnb/8323.
[466] Dickson, *Tessera of Antilia*, 124.
[467] *HP*, 27/34/1A-B, dhi.ac.uk/hartlib/context.
[468] Turnbull, *HDC*, 128; *HP*, 27/34/1A-B, dhi.ac.uk/hartlib/context.

Hartlib that these things may perhaps have been spun from the brain of Robert Fludd or Bacon."[469]

It is likely that such particulars as would concern Dury with a progressive utopian island like *Antilia* would originate with Bacon rather than Fludd. [470] The association is borne out by the perhaps non-coincidental similarity of *Antilia* to Bacon's Bensalem in *New Atlantis*. Bacon himself might have borrowed from the extant legend of *Antilia* in his construction of the fictional setting. Dickson notes that Heinrich Hein's (Pömer's predecessor) utopian group, Antilia, was greatly influenced by the writings of Johann Valentin Andreae (1568-1654), notably Andreae's *Christianae societatis imago*, published in Germany in 1619.[471] Fridwald, having been a committed Antilian from the mid-1620s (he arrived in Rostock in June 1624), is wont to ascribe Dury's "splendid things" as having been gleaned by Dury from the work of Fludd or Bacon. This would suggest that Dury had not been, or at least was suspected by Fridwald not to have been, wholly conversant in the Antilian theatre, though Dury's ideas were compatible with the Antilian project.

If Fridwald's report is accurate, Dury would have been speaking his "splendid and wonderful things" on philosophical behalf of Bacon. Robert Fludd, while an able instrument-maker (and, indeed, an anti-Aristotelian who favoured, like Bacon, the sensory experience of experiment as the means to truths), most likely would not have had the intellectual, philosophical, or publishing profile to match Bacon's.[472]

The other notable issue that we may take away from the above letter concerns the nature of association between Dury and Hartlib. Bacon obviously occupies a prominent

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[469] Turnbull, *HDC*, 128; *HP*, 27/34/1A-B, dhi.ac.uk/hartlib/context.

[470] See Dickson, *Tessera of Antilia*, 114 ff. *Antilia* was the name given the utopian group initiated by Henrich Hein, who taught law at Rostock. Member Johann Abraham Pömer corresponded regularly with Hartlib, Dury, and Comenius. Dickson notes that Fridwald came to the University at Rostock in June 1624.

[471] Dickson, *Tessera of Antilia*, 114.

[472] E.G.R.Taylor, *The Mathematical Practitioners of Tudor & Stuart England* (Cambridge: For the Institute of Navigation at the University Press, 1968), 192. Also, in his analysis of the same letter, Pierre-Oliviet Lechot adds another interesting aspect to the similarity of Dury's ideas to those of Bacon and Fludd: "Après son arrivée à Elbing, Dury fut très rapidement embrigadé dans travaux les membres d'*Antilia* qui se trouvaient alors dans la ville, sans doute parce que ses propres idées entraient en accord avec les intérêts de la société. C'est ce dont atteste une lettre de Fridwald à Hartlib de février 1628 qui renvoie à un courrier de fin 1627, faisant état des réflexions du nouveau ministre anglais de la cité. Fridwald associe ces travaux – qu'il ne connaît encore que par le rapport de Hartlib – à ceux Bacon et de Robert Fludd, ce qui n'est pas sans intérêt, dans la mesure où les ouvrages de ce dernier, défenseur affirmé des Rose-Croix, portaient entre autres sur des question d'herméneutique kabbalistique qui, semble-t-il, agitaient Dury à cette époque." [After his arrival in Elbing, Dury was very quickly recruited in the works of the members of Antilia who were then in the city, undoubtedly because his own ideas were in agreement with the interests of the society. This is evidenced by a letter from Fridwald to Hartlib from February 1628 which refers to a letter from the end of 1627, reporting the reflections of the new English minister in the city. Fridwald associates these works – which he only knew through Hartlib's report – to those of Bacon and Robert Fludd, which is not without interest, since the works of the latter, an affirmed defender of the Rose Cross [Rosicrucians], was concerned among other things with questions of Kabbalistic hermeneutics which, it would seem, perturbed Dury at that time.] Lechot, *Un christianisme «sans partialité»*, 77-78.

philosophical place amongst the Antilia group, and, not least, Hartlib and Dury (and Fridwald, who needs no prompting to recognise Baconian language) are easily conversant with the work of the Great Instauration. As of early 1628, Both Hartlib and Dury would seem to share a robust adoption of Baconian epistemology.

The letter from Fridwald to Hartlib dated 10 February 1628 reveals that Hartlib and Dury were acquainted, but we cannot tell for how long. The first (surviving) evidence of direct correspondence does not appear until later that year. It includes two tracts combined under a single heading in the Hartlib Papers entitled "Copy Extracts in Hand?, Dury to Hartlib?, in English and German."[473] These extracts are dated respectively 13 November and 8 December. The original year given by the "scribal hand" is 1638, but this, as the heading asserts, is most likely a mistake, and that 1628 had been the intended date.[474] The subject matter of the correspondence certainly corroborates this claim, since we encounter Dury's contribution to an apparently ongoing dialogue with Hartlib about the advancement of education and learning, a discussion that will lead to the founding of Hartlib's ill-fated Chichester school in 1630.

The first part of Dury's extract dated 13 November begins with what we might surmise is an implication which points to Bacon's influence. We note further that Dury uses Bacon's imagery and language not as formal citation for his own philosophical precepts, but instead to describe personal pathos. We can thus reasonably infer that Dury is drawn to Bacon's legacy by a passion that is both intellectual and emotional. Dury writes,

> As for Pædagogicall affaires they have hitherto taken vp all my spare hours for I am almost entred into a Labirinth [altered from Labarinth] seeking to enter into a particular consideration of the whole duty of a Tuto*ur* how hee ought to be fitted & prepared for the Charge & what hee ought to leade a Child from his infancy as it were by the hand through an insensible Custome of well doeing vnto a perfect degree of all vertues I did almost loose my selfe in the variety of things that did offer themselves to bee considered & therefore was forced to breake off in the midst & to gather the […] generall heads of the whole Pedigogicall care that I might have a filum Ariadnes to order my thoughts.[475]

The imagery in the passage is one, again (as with the tree of philosophy discussed above), that is particularly Baconian. Bacon employs the metaphor of the labyrinth and the thread of Ariadne (*filum labyrinthi*) as central explicatory fixtures in the precepts of both his natural and pedagogical philosophy. Here, noting the date of the correspondence, Dury is most likely referring to at least two particular sources, his language suggesting a familiarity with *Novum organum* (1620) and *De sapientia veterum* (1609).

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[473] Turnbull, *HDC*, 130; also, *HP*, 1/12/1A-4B, dhi.ac.uk/hartlib/context.
[474] *HP*, 1/12/1A-4B, dhi.ac.uk/hartlib/context.
[475] *HP*, 1/12/1A, dhi.ac.uk/hartlib/context.

We can compare Dury's choice of reference to a section in the "Preface to the Great Instauration" which first appeared when Bacon included it amongst the prefatory text in the 1620 publication of *Novum organum.* We have already visited this passage as it appears in Wats' Preface to his 1640 translation of *De augmentis*. In the passage, Bacon vividly expresses the nature of inquiry in poetically dramatic terms that must certainly have struck Dury. We keep in mind Dury's expression of the personal trial that accompanies his endeavour into the proper education of children. This echoes Bacon's description of the existential challenge which describes the human inquiry into nature and the acquisition of knowledge thereafter. It is hardly the stuff of frivolous virtuosity. In fact, it would appear that Dury not only means to invoke Bacon's words and images, but his pathos as well. We again return to Bacon's passage, written under a decade prior to Dury's letter. The text below is taken from Bacon, *NO,* 19:

> Now to the human intellect reflecting on it, the fabric of the universe looks in its construction like a labyrinth, where we find everywhere so many blind alleys, and such deceptions and misleading signs and such oblique and intricate convolutions and knots of nature. But the journey has always to be made through the woods of experience and of things particular, guided by the uncertain light of sense which sometimes flares up and at others dies down. Even those who […] present themselves as guides on our journey are themselves ensnared in the thickets, and add to the number of errors and errant souls. In such difficult circumstances we must then lose faith both in the naked force of human judgement and even in chance success. For these difficulties cannot be overcome by any amount of genius or the repeated gambling on the results of experience. No, our tracks must be guided by a clue, and a sound policy must secure every step of the way right from the very perceptions of the senses.[476]

Of particular note is Dury's invocation of the labyrinth to describe the arduous embarkation on a new project for which there is no comforting precedent. Further, we can compare Bacon's use of the word "clue" to Dury's use of the expression "filum Ariadnes." These are semantically related terms, and Dury most likely did not make reference to the thread of Ariadne frivolously. I discuss below the significance of "clue" and "filum Ariadnes" in my analysis of Daedalus.

It is thus that we examine the second Baconian source with which Dury appears to be familiar, *De sapientia veterum* (1609). In particular, as we have just alluded, he invokes the fable of "Daedalus; or the Mechanic." As a mythic figure, Daedalus proves an apt specimen to convey Bacon's discourse on the epistemological division between individual and civil moral virtue. In his works, Bacon observes that individual and collective species of moral virtue are

[476] Bacon, *NO*, 19; also, Bacon, *OAPL*, 13-14.

often respectively at odds. Daedalus is the embodiment of this antithetical relationship. As Bacon describes, Daedalus was

> banished for murdering a fellow-pupil and rival […] yet found favour in his banishment with kings and states. Many excellent works, as well in honour of the gods as for the adornment and ennobling of cities and public places, had been built and modelled by him; but it is for unlawful inventions that his name is most famous.[477]

Daedalus' success as "a man of the greatest genius" is thus offset by his "very bad character."[478] His individual goodness and moral virtue remain uncultivated and thus his contribution to humanity is a success of creation and production but not of beneficence or charity. Bacon uses Daedalus as a warning that mechanical arts and the geniuses that work in them must be guided by the motions of moral material. This is to ensure that human creativity is put to appetitively good rather than evil ends; reason is just as easily seduced by evil as it is by goodness. Bacon's recognition of the dangers inherent in the mechanical arts corresponds directly to his recognition of the dangers inherent in an undisciplined intellect, as in the case of Daedalus. In both cases,

> human life is much indebted to them for very many things which concern both the furniture of religion and the ornament of state and the culture of life in general, are drawn from their store. And yet out of the same fountain come instruments of lust, and also instruments of death.[479]

Thus, Bacon applauds Daedalus' mechanical genius, but only insofar as it might be guided through the husbandry of goodness and moral virtue. Bacon understands but regrets that the "ancients [have drawn] a picture of mechanical skill and industry […] together with its unlawful artifices and depraved applications."[480] In his precepts, mechanical genius must be placed in the remit of goodness and moral integrity achieved by the individual inquirer in order that its (mechanical genius) products serve the Good of Communion. Man is not inherently good (only inherently reasonable) but he is created by God with the potential to be so. The project of this potential is central to Bacon's philosophy. In this sense, the mechanical skill of Daedalus is not to be condemned, only his failure to properly husband goodness and moral virtues from the reason of his will.

The dynamic between mechanical skill and moral husbandry would have fascinated Dury. He was himself aware that Man's potential for good works is equal to his potential for diabolical works. As Bacon writes, "the mechanical arts may be turned either way, and serve as well for the cure as for the hurt and have power for the most part to dissolve their own

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[477] Bacon, *DSV*, 734.
[478] Bacon, *DSV*, 734.
[479] Bacon, *DSV*, 735.
[480] Bacon, *DSV*, 734.

spell."[481] As we will see in his account of his travels in Germany, Dury admits his own vulnerability to a potential to "serve as well for the cure as for hurt."

The danger of mechanical skill that lacks the proper husbandry of individual goodness, like the danger of a keen intellect without an equal deference to the discipline of sense-experience, defines the human relationship to the labyrinth of knowledge. According to Bacon's fable of Daedalus, the labyrinth describes "the general nature of mechanics."[482] Daedalus built the original Labyrinth "to conceal the first mischief" of his preceding contraption, a wooden machine in the form of a cow which enabled King Minos's wife Pasiphae to successfully procreate with a bull.[483] From this coupling was born the half-man, half-bull Minotaur whom Minos commanded be imprisoned in Daedalus's labyrinth. Bacon notes that while this creation was "a work wicked in its end and destination […] in respect of art and contrivance [it] was excellent and admirable."[484] In particular, the allegory is important to Bacon (and Dury) for its provision that "the same man who devised the mazes of the labyrinth [must] [disclose] likewise the use of the clue."[485] The disclosure, or discovery as it happens, of the "clue" is a fundamental aspect of Bacon's natural philosophy. The labyrinth is built to frustrate human intuition; "scarcely any judgment can order and discriminate" its parts, which confound the unaided intellect with either "variety" or "likeness" amongst its intricate parts.[486]

It is here that we note the importance of the "clue" to which both Bacon and Dury allude. While Bacon uses the word itself, Dury's delivers his allusion in his abstract appeal for a "filum Ariadnes." In the Greek mythology, Ariadne provides Theseus with a ball of thread which allows him to retrace his steps out of the Labyrinth after slaying the Minotaur.[487] the *Oxford English Dictionary* lists the respective definitions of the noun "clue" according to the chronology of its etymological development. The term is a "later spelling of the Middle English CLEW *n.*," and seems to have come into use in its current spelling in the late-medieval period, in the late fourteenth century.[488] The first definition [1a] is "a ball of yarn or thread."[489] The accompanying list of phrasal examples begins with the year-date of 1393, in the form of a brief line from John Gower's (1330-1408) *Confessio Amantis*: "She did him

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[481] Bacon, *DSV*, 735.
[482] Bacon, *DSV*, 735.
[483] Bacon, *DSV*, 734
[484] Bacon, *DSV*, 734.
[485] Bacon, *DSV*, 735.
[486] Bacon, *DSV*, 735.
[487] Ovid, *Metamorphoses*, trans. Mary M. Innes (Harmondsworth: Penguin Books, 1974), 183-184.
[488] *OED*, "clue, n.," https://www.oed.com/view/Entry/34830?rskey=sX09Tg&result=1 (accessed April 30, 2021).
[489] *OED*, "clue, n.," https://www.oed.com/view/Entry/34830?rskey=sX09Tg&result=1 (accessed April 30, 2021).

have A clue of thread."[490] Definition [2a] is strikingly specific. It is given as "a ball of thread, employed to guide any one in 'threading' his way into or out of a labyrinth […] or maze; hence, in many more or less figurative applications, a fact, circumstance, or principle which, being taken hold of and followed up, leads through a maze, perplexity, difficulty, intricate investigation, etc."[491] The *OED* dates the earliest phrase example in this sense [2a] to 1605, and provides a phrasal example from a poem by Michael Drayton (1563-1631). Having itself perhaps served as influence to Bacon's exposition on the fable of Daedalus, Drayton's line reads, "Loosing the clew which led vs safely in, [We] Are lost within this labyrinth of lust."[492]

For Bacon, the labyrinth represents the human potential for the most "wicked works." However, as we have touched upon, Man's potential for wickedness is inescapably appended to his potential to create, if only mechanically, what might be beneficial.[493] Hence, the indication that beneficence has triumphed is communicated through the act of "the same man who devised the mazes of the labyrinth disclos[ing] likewise the use of the clue."[494]

Conversely, the man who refuses to share his knowledge acts on behalf of wickedness. Whomever should find a path through the woods of nature's secrets is bound, Bacon asserts, to share the means and methods by which he found the path. Knowledge of the clue was, in Bacon's view, the potential, the promise inherent in the deficient character of Daedalus. The key to attaining the clue, or the "filum Ariadnes," is attained not in the suspension of mechanical arts, but in the cultivation of goodness and moral virtue as the aegis for their pursuit.

Dury characterises his own impending endeavour of pedagogy as first a moral exercise. Immediately following his plaint for the "filum Ariadnes," he promises Hartlib that "[t]his generall meditacion is here sent vnto you (he vnderstands the exercitacion called [*another hand?:* De Spirituali agricultura][sic]) & the rest of the particulars (viz [*another hand?*[*:* De morum puerilium Disciplina][sic]) when they are ready shall not bee kept backe."[495] The language in this difficult sentence leaps out at us. Dury speaks of his labyrinthine task as one founded on "spiritual husbandry (*de spirituali agricultura*)."[496] For him, the labyrinth he must negotiate involves not the display of vain authority, but he himself

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[490] *OED*, "clue, n.," https://www.oed.com/view/Entry/34830?rskey=sX09Tg&result=1 (accessed April 30, 2021).
[491] *OED*, "clue, n.," https://www.oed.com/view/Entry/34830?rskey=sX09Tg&result=1 (accessed April 30, 2021).
[492] *OED*, "clue, n.," https://www.oed.com/view/Entry/34830?rskey=sX09Tg&result=1 (accessed April 30, 2021).
[493] Bacon, *DSV*, 734.
[494] Bacon, *DSV*, 735.
[495] *HP* 1/12/1A, dhi.ac.uk/hartlib/context.
[496] *HP* 1/12/1A, dhi.ac.uk/hartlib/context.

"learning about the behaviour of children" (*de morum puerilium Disciplina*).[497] This subtlety of semantic evokes Dury's self-identification as an imperfect instrument who seeks greater proficiency in his moral husbandry.

5.2.2 Hartlib and Dury: Direct Correspondence

The first direct correspondence between Hartlib and Dury regarding the adoption of Bacon's philosophy begins in 1630. During this year, Hartlib, having been resident in England since 1628, embarked on the "setting up of a school in which to educate well-born youths" in Chichester.[498] Dury was involved with the project, as was mathematician John Pell, whom Hartlib had recruited to teach there. Bacon's precepts for the advancement of learning were at the core of the school's intended mission. That this project was a quick failure and caused great personal expense to Hartlib does not diminish Bacon's role in the thinking and planning of the founders.

In the following excerpt from Hartlib's letter to Dury dated 13 September 1630, we note not just the mention of Bacon's epistemological precepts, but, as with Dury's early correspondence, the emulation of Bacon's style of literary exposition. Further, Hartlib reveals a detailed advocacy of Bacon's principles that approaches pious defence. The passage serves as the passionate expression of Hartlib's Baconian views, and we can surmise that he writes with the fuel of a full knowledge that the addressee, Dury, shares his enthusiasm. Hartlib conveys not only his subscription to Bacon's principles, but also to Bacon's impatience with "discourse of Illustrations, [and] Recitals of Exampels" in favour of "some good Quantitie of orderly obseruations."[499] This suggests a philosophical intimacy with Bacon that extends far beyond virtuosic fancy. Also in the following piece, we see testimony, *ex ante*, which supports Charles Webster's note that Gilbert Wats' English translation of *De augmentis* (1640) occupied a prominent place in Comenius's estimation.[500] Here, in 1630, we see that Hartlib and Dury were fully conversant with that particular work well over a decade prior to Wats' translation. Hartlib writes to Dury,

> As for the general project of Education & Reformation of all sortes of Learning, j know you want nothing but time. When you goe about to answer Mr Pelles Questions which j sent you last time let me entreate you to resolue also these following. As first what course to be taken with a Scollar after he understands the precepts of Logick & the common vse of it in Genesis & Analysis. Whether he were best to bee taught the fullest & best ordered Systemes which as yet wee can haue. & that Tabularised. I meane the whole Method of an Art & Science with all the definitions Diuisions and Canons,

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[497] *HP* 1/12/1A, dhi.ac.uk/hartlib/context.
[498] Turnbull, *HDC*, 36.
[499] *HP*, [7/12/2B]-[7/12/3A], dhi.ac.uk/hartlib/context.
[500] Charles Webster, "Introduction," *Samuel Hartlib and the Advancement of Learning*, 32.

> together with the feat of the Ars Vniuersalis. Or rather to follow my Lord Verulams directions in his so much commended Aphorismes as the onliest way for deliuerie of Knowledge *whi*ch hee largely describes in his Organon Novum but more especially in his booke De Augmentis Scientiarum. For rejecting the former Systemical faggoting Precepts into a sensible Method, hee chooses the course of Aphorismes. Which except they should bee ridiculous & vnseruicable (trying the Writers or Eclogators whether they bee superficial or solid) cannot bee made but of the pyth and heart of Sciences. For discourse of Illustration must bee cut off, Recitals of Exampels, discourse of Connexion & Order, descriptions of practise & the like must bee cut off; & nothing remaine to fill the bodie, but some good Quantitie of orderly obseruation; yet not [carring?] a kinde of demonstration in Orbe or Circle one part illuminating another. For this indeed hase satisfied many, wherby it comes to passe, that *learning is reduced to certain emptie & barren Generalities, being but the very Huskes & Shales of Sciences, all the Kernel being forced out, & expulsed with the torture & presse of their vntimely Methods* And thus because they carrie the shew of a Totall, they doe præposterously secure men as if they were at furthest. Wheras the Aphorismes representing a Knowledge broken doe inuite men to inquire further.[501]

The most dramatic tribute to Bacon in the passage above ironically is not conveyed in Hartlib's explicit invocation of "my Lord Verulam" or even in the mention of *De augmentis*. It occurs toward the end of the letter. Here, Hartlib demonstrates his intimate knowledge of Bacon's work, as he cites his words almost verbatim. Hartlib seems to all but transcribe his complaint that "learning is reduced to certain emptie & barren Generalities, being but the very Huskes & Shales ['shells'] of Sciences, all the Kernel being forced out, & expulsed with the torture & presse of their vntimely Methods" directly out of what could be one of several Baconian sources. The first appearance of Bacon's expression invoked by Hartlib occurs in Book 2 of *The Advancement of Learning* (1605). Here, as Bacon describes the necessity of adopting "Diuersitie of *Methodes* […] *According to Subiect or Matter*," he alleges the pedagogical and epistemological error in the endeavour to apply a uniform method of teaching and inquiry to a "*Mutiformitie* of Matter."[502] Bacon stresses the great epistemological difference between "Deliuerie of the *Mathematiques*, which are the most abstracted of knowledges, *Policie*, which is the most immersed."[503] Should the diversity of subjects and natural matter be amalgamated under a solitary methodological approach (the great error, for example, of the scholastics), the way is then taken, as Bacon expresses, "to reduce Learning to certaine emptie and barren Generalities; beeing but the verie Huskes, and Shales of Sciences, all the kernell beeing forced out, and expulsed, with the torture and presse of the *Methode*."[504]

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[501] *HP*, [7/12/2A-7/12/3A.], dhi.ac.uk/hartlib/context. Emphasis mine.
[502] Bacon, *AL*, 125.
[503] Bacon, *AL*, 125.
[504] Bacon, *AL*, 125.

Bacon would further recycle this metaphorical passage in *De augmentis* (1623). Here, however, he would divide the passage and disperse the two parts over two pages in Chapter 2 of The Sixth Book of *De augmentis*, which is devoted to "*The wisedom of Deliverie*." [505] Its purpose remains the same as in *The Advancement of Learning*, that is to transmit the necessity of applying a particular subject to a proper method of inquiry rather than commit error of applying a particular method of inquiry to a subject no matter its discipline. This property of advancement would certainly have resonated with Hartlib and Dury, who were thus able to apply Bacon's precepts to multifarious ends beyond those formally scientific. The Great Instauration served as the model for such diverse pursuits as educational reform, religious irenicism, and even, in Gabriel Plattes' remit of the Hartlib Circle, agricultural husbandry. In the Sixth Book of *De augmentis*, Bacon re-applies his words from *The Advancement of Learning*:

> *For these* Dichotomists, *when they would wrest all things to the Lawes of their Method, and whatsoever doth not aptly fall within those* Dichotomies *they would either omitt or how contrarie to their naturall inclination*; they bring it to passe, that the *Kernels and Graines of Sciences leape out, and they claspe and inclose onely the drie and emptie huskes*: *So this kinde of Method brings forth fruitlesse Compends, destroyes the substance of Sciences*.[506]

I further point to the closing text of Hartlib's correspondence above for its derivation from the Baconian source. Hartlib regrets the hazards caused by "vntimely Methods . . . because they carrie the shew of a Totall [and so] doe preposterously secure men as if they were at furthest," while offering the assurance "Wheras the Aphorismes representing a Knowledge broken doe inuite men to inquire further." This again is taken directly from Bacon's *Advancement of Learning* (1605), in fact from the page immediately preceding his invocation of "Huskes and Shales of Sciences." Bacon writes, "*Aphorismes*, representing a knowledge broken, doe inuite men to enquire further; whereas *Methodes* carrying the shewe of a Totall, doe secure men; as if they were at furthest."[507] These concerted citations of Bacon's precise words by Hartlib indicate far more than passive appreciation. Further, given

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[505] Bacon, *OAPL*, 271.
[506] Bacon, *OAPL*, 271-272.
[507] Bacon, *AL*, 124. Howard Hotson discusses this same passage of Hartlib's correspondence in his essential volume *The Reformation of Common Learning: Post-Ramist Method and the Reception of the New Philosophy, 1618-c.1670* (Oxford: Oxford University Press, 2020), 287-288. However, Hotson's intent is to use the passage to illustrate the discrepancy between the "systematics and true Baconians" (Hotson, *Reformation*, 287). Hotson suggests that in *The Advancement of Learning* (1605), "Bacon . . . appears to be responding precisely to [Bartholomäus] Keckermann . . . [whose] *commentaria* consisted precisely of 'illustrations', 'examples', discussions of method ('connexion and order'), and instructions for application ('practice')." (Hotson, *Reformation*, 288) Hotson continues, "Bacon's objection is to the practice 'out of a few axioms or observations upon any subject, to make a solemn and formal art, filling it with some discourses [*commentationibus*] [sic], illustrating it with examples, and digesting it into a sensible method [*et methodo revinciendo*] [sic]" (Hotson, *Reformation*, 288).

Hartlib's almost verbatim repetition of Bacon's passages from the 1605 edition of *The Advancement of Learning* combined with his later (especially in the 1640s) expressions of allegiance to *De augmentis*, I find it plausible that Hartlib was more than passingly familiar with both texts.

5.3 John Dury: Early Echoes of Bacon

As we note the early influence of Hartlib in the realm of the advancement of learning and pedagogy, we soon encounter evidence of Bacon's moral influence in Dury's writings. Dury does not make this as explicit as it is in Hartlib's direct text-borrowing above. However, the similarity of the former's approach to Christian moral virtue, combined with the aforementioned references to Bacon, especially from *De augmentis*, suggests that Dury has also been acquainted with the moral aspects of Bacon's precepts.

In an early letter to Samuel Hartlib, undated other than by the year 1632, Dury explains his encounter with the predicament set before him by his ecumenical and irenic project on behalf of European Protestantism. His success, he realises, not only requires the leniency of others, but, of most difficulty, the best of himself. Dury serves as an exemplary case study by which to illuminate Bacon's prescience in outlining the crucial aspect of individual moral virtue in the reformation of the human instrument. In the description of his travels – and travails – through the German lands, Dury, perhaps unwittingly, relays his own epistemological parallel between Man's endeavour to keep the "habits of evil" at bay and the endeavour to attain the proper light of individual and civil knowledge.[508] He suggests the methodological application of experience and observations as means to explore the moral substance of Man. Here, Dury provides us an early episodic glimpse of his own trials and experiences which inform his pursuit of "practical divinity."[509] He paints an accurate portrait

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[508] See *ODNB*, s.v. "Durie [Dury], John (1596-1680)," by John T. Young, 2019, https://doi-org.libproxy.york.ac.uk/10.1093/ref:odnb/8323.

[509] Dury refers to "practical divinity" *passim* through his career and works. See, for example: John Dury, *The Unchanged, Constant and Single-Hearted Peace-Maker Drawn Forth into the World. Or, A Vindication of Mr. John Dury from the Aspersions Cast upon Him in a Nameless Pamphlet Called, the Time-Serving Proteus and Ambidexter Divine, Uncased to the World. Wherin the Two Letters Written Seventeen Years Ago the One to Joseph Hall, then Bishop of Exeter, the Other to William Laud, then Arch-Bishop of Canterbury, are Cleared from the most False and Injurious Interpretations Put upon them. Entered According to the Late Act Concerning Printing* [Time-serving Proteus, and ambidexter divine, uncased to the world.]. (London: 1650), 9. https://www.proquest.com/books/unchanged-constant-single-hearted-peace-maker/docview/2240912211/se-2.; Also, see John Dury, *A Motion Tending to the Publick Good of this Age and of Posteritie, Or, the Coppies of Certain Letters Written by Mr. John Dury to a Worthy Knight at His Earnest Desire Shewing Briefly Vvhat a Publik Good is and how by the Best Means of Reformation in Learning and Religion it may be Advanced to some Perfection / Published by Samuel Hartlib* .. [Coppies of certain letters written by Mr. John Dury. Copies of certain letters written by Mr. John Dury.]. (London: 1642), 21-22. https://www.proquest.com/books/motion-tending-publick-good-this-age-posteritie/docview/2248555344/se-2.

of the inherent difficulty in maintaining one's individual moral integrity in the public, or political, realm. Evil, Dury suggests below, takes its greatest comfort in the company of society. Further, we will especially note Dury's association of Godlinesse with sensible (that is, sensory) exercise. Dury, as has Bacon before him, takes care to place humanity in the realm of second causes, that of creation, not in the realm of divinity. He confides to Hartlib,

> [I]f in the first period of my journey I hadde want of good companie, & by a long course of meere civill & merrie conversation I was so corrupted, that when I came to a tryall of Faith; I found no accesse to the throne of grace for a long while; how much more in this last period, where I hadde neuer want to the worst companie that could be found, <in> a long course of beastlye conversation; thinck you, I was utterly defeat & ouerthrowne by a contracted habit of Euill, growen ouer the face of my soule? Verily, verily, if a man bee not confirmed in grace as I find I am not; or if a man haue any Politic Endes, as I hadde, & to further them must use, or bee in the societie of Euill companie, as I then (to come to my journeys ende) was forced to bee; verily (I say in this case) euill companie is the greatest snare that Satan hath to take from us the ioy & peace of a good conscience, & to enfluence flesh & blood to intemperate & unruly lusts; whence all good affections & dispositions of the Spirit are ledde captiue under the bondage of customarie sinnes.
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> to verify this I could write a little volume of Experience and obseruations whereof this could bee a summe. To shew .1. how Civill & Politic conversation though outwardly honest & before men blameless, is a snare to the power of Godlinesse .2. how the power of Godlinesse for want of due exercise & ordinarie practise dyeth & decayeth insensiblely in the chief vertues & faculties therof: which are the light of the understanding; the watchfulnesse of a good conscience ouer a man's heart & actions.[510]

Dury's closing words in this combined critique and confession are strongly redolent of Bacon's conflation of moral virtue and understanding. In Dury's (and Bacon's) view, Man himself is a participant in the scheme of *Godlinesse*, the power of which occurs through the effort of Man's moral husbandry, not God's grace. Without Man's concerted "exercise and ordinarie practice," this "Godlinesse dyeth and decayeth." Dury expresses that Godliness does not itself die and decay; what dies and decays is the human ability to live by its principles. The light of understanding is enabled only by the *"watchfulnesse of a good conscience."* Man is not himself a fount of moral virtue. He is the only creature of Creation that must consciously invoke, verily construct, his primary goodness and his subsequent moral virtue. Goodness is the property in Man that emulates the positive power of nature and the moral virtues represent the passionate proof of that goodness. For Bacon, Man, if due either wholly or respectively to his diseased mind or the Fall or his desire to be correct and have a rested mind, must now author his own summary law relative to his individual morality. Thus, we may consider summary law a parallel term to goodness. Nature does not recognise, defer to,

[510] *HP*, 60/5/5A, dhi.ac.uk/hartlib/context.

or reward human moral virtue. Instead, Man's moral virtues signify his deliberate construction and husbandry of the analogous inherent, appetitive good which is at the genetic, appetitive core of nature. Dury presents Man as himself a part of nature – of Creation – not of divinity.

Thus, we can compare Dury's passage above with Bacon's quote from *The Advancement of Learning*:

> [T]he light of Nature is vsed in two seuerall senses: The one, that which springeth from Reason, Sense, Induction, Argument, according to the lawes of heauen and earth: The other that which is imprinted vpon the spirit of Man by an inward Instinct, according to the lawe of conscience, which is a sparkle of the puritie of his first Estate; In which later sense onely, he is participant of some light, and discerning: touching the perfection of the Morall lawe: but how? Sufficient to check the vice, but not to informe the dutie.[511]

What is particularly important to note in Bacon's passage, especially as it informs Dury's, is the former's identification of a divine moral law in which Man can claim to be a "participant of some light." Bacon further provides that this participation implies significant limitations; it is but a "sparkle of the puritie of his first (viz., prelapsarian) Estate." However, now Man must grasp that in his postlapsarian state, he is provided only the *potential* for his own moral progress by God. This potential begins with the proper cultivation of the inherent unclaimed reason in the will. The actual material of goodness and moral virtue must be constructed by Man through his own energies, through his own choice. Such a limited provision only serves as the basis of being "[s]ufficient to check vice." It is not sufficient to serve as the foundation for Man's "dutie." This latter degree of moral status must be cultivated by Man on his own by his own will.

Dury alludes to this above. The power of Godliness is only manifest in Creation itself and must be sought by Man. To lapse in this exercise is not only tantamount to an obstruction of Man's relationship to God, it also dims the "light of [Man's] understanding." If Man had been privileged to be intimate with divine morality before the Fall, his lot is now to cultivate his moral virtue along with Reason and Sense as a participant in the divine schematic as it pertains to second causes, not – as Adam had once been – as an intimate of God.

Dury confirms his allegiance to Baconian epistemology as he here describes the interdependent relationship between moral virtue and correct intellectual understanding. The former must precede and then co-exist with the latter. Dury's take on this may perhaps be infused with a greater degree of Christian theology than Bacon's, but the implied result would promise to be the same.

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[511] Bacon, *AL*, 183.

In 1631, Dury penned "The Purpose, and Platforme of the Iourneyes that are vndertaken for the worke of Peace Ecclesiasiticall, and other profitable ends."[512] In the tract, he elucidates his plan to embark on a tour of the German lands (which would be financed by Sir Thomas Roe) to effect "the advancement of peace in the Churches, and for the building vpp of one another in the power, and truth of Godliness."[513] Here, at the outset, it appears that Dury appropriates Bacon's language as he proposes the "*advancement* of peace (Dury's "peace" in place of Bacon's "learning") and the "*building up* of one another (Dury's "one another" in place of Bacon's "philosophy").[514] From other episodes as we have seen above in the examination of Hartlib and Dury's correspondence, this is likely to be a deliberate grafting exercise on the part of Dury.

The text of this early work continues in the Baconian vein. Dury models his "practical divinity" (he will later provide an expressly dedicated literary platform for it in *A Motion Tending to the Publick Good* in 1642) on Bacon's practical learning. Invoking Bacon's project involving the construction of a comprehensive natural and experimental history, Dury's *Purpose and Platform* lists the facets of his "cheefe and maine purpose."[515] Leading this list are "[t]hings to be gathered: (1) All rare Bookes, (2) All Inventions, and Feats of Practise in all Sciences."[516] Thus, we are presented with evidence that Dury esteems Bacon's intellectual preparations for the advancement of learning to provide the material of ecclesiastical peace. Dury recognises that this peace between sects is a project of second causes; the divine realm itself is, almost paradoxically, not involved.

Dury's juxtaposition of "rare books" and "all inventions" point to a quintessentially Baconian endeavour to join all potential springs of knowledge and learning. Nothing should be left out. In the Second Book of *De augmentis*, Bacon lays out his scheme for a comprehensive Natural History, which, he contends, should include not only accounts of "*Creature*, or of *Plants*, or of *Mineralls*," but also "experiments of Mechanicall Arts."[517] This precept serves as Bacon's recognition – and so Dury's – that Man's work, his arts, belong not only to the world of Man, but to the natural world, as well. They are a secondary facet of Creation, the postlapsarian products of second causes. Again, as Bacon's epistemology joins

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[512] *HP* 18/17/1A-4B, 4A-B, dhi.ac.uk/hartlib/context; See also, G.H. Turnbull, *Samuel Hartlib: A Sketch of His Life and His Relations to J.A. Comenius*, facsimile reprint (Oxford: Oxford University Press, 1920; repr., Franklin Classic, 2018?), 10-13; also, Turnbull, *Hartlib, Dury and Comenius*, 304.
[513] *HP* 18/17/1A-4B, dhi.ac.uk/hartlib/context; Turnbull, *Sketch*, 10.
[514] Dury most likely invokes Bacon's *The Advancement of Learning* (1605) and *Phenomena of the Universe or Natural History for the Building Up of Philosophy*. Graham Rees estimates the latter to have been composed in 1611, though it was published in 1622. (*OFB*, vol. 6, xxvi-xxvii).
[515] *HP* 18/17/1A-4B, dhi.ac.uk/hartlib/context; Turnbull, *Sketch*, 11.
[516] *HP* 18/17/1A-4B, dhi.ac.uk/hartlib/context; Turnbull, *Sketch*, 11.
[517] Bacon, *OAPL*, 80.

the appetitive material of goodness with the active forces in nature, we see Dury affirm that Man's arts belong to the natural world because Man himself is part of that world. We recall Bacon's assertion "[*t*]*hat Artificialls differ not from Naturalls in Forme and Essence; but in the Efficient only*; for man hath no power over *Nature* save only in her *Motion*."[518]

Bacon indeed warns against "Bookes […] fraught with fabulous experiments, forged Secrets, and frivolous Impostures."[519] However, he simultaneously asserts that "[n]either doe[s] [he] give in precept that superstitious Narrations of Sorceries, Witchcrafts, Inchantments, Dreams, Divinations, and the like, where there is cleere evidence of the fact and deed done, be altogether excluded […]."[520] Such is the spirit of inquiry inherited by Dury. Rarities and commonalities are to be treated with the same attention, as are natural occurrences and human mechanical arts.

Dury proceeds beyond the "things to be gathered" in *Purpose and Platform*, and submits a four-item list of "[t]hings to be observed."[521] Under this heading are five further subordinate enumerated items. Among them, Dury includes two provisions (items [2] and [4]) for the development of languages, "Orientall" and "Magicall," devoted respectively to the very earthly and practical endeavours of multicultural understanding and the "deliver[ance]" and "preserv[ation]" of "secrets." [522] These mirror Bacon's multifaceted and extensive provisions in the Sixth Book of *De augmentis*. In one of many applicable discourses, Bacon calls for

> some man thoroughly instructed in many *Languages*, as well *Learned*, *as Mother-tongues*, should write a Treatise of the diverse Properties of *Languages*; shewing in what points every particular Language did excell; and in what points it was DEFICIENT. For so *Tongues* might be enricht and perfected by mutuall intertrafique one with another; and a most faire Image of speech […] and a goodly patterne for the true expression of the inward sense of mind, might be drawne from every part which is excellent in every Language.[523]

The third item on Dury's list of "things to be observed" is devoted to "Arts and Sciences Philosphicall, Chymical and Mechanicall; whereby not only the Secrets of Disciplines are harmoniously and compendiously delivered, but also the secrets of Nature are thought to be unfolded, so that God's wonderfull power, wisdome and goodnes is to be seene more apparently in bodily things than ever heretofore."[524] Dury might have taken this passage

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[518] Bacon, *OAPL*, 80.
[519] Bacon, *OAPL*, 81.
[520] Bacon, *OAPL*, 81-82.
[521] *HP* 18/17/1A-4B, dhi.ac.uk/hartlib/context; Turnbull, *Sketch*, 11.
[522] *HP* 18/17/1A-4B, dhi.ac.uk/hartlib/context; Turnbull, *Sketch*, 12.
[523] Bacon, *OAPL*, 261.
[524] HP 18/17/1A-4B, dhi.ac.uk/hartlib/context; Turnbull, *Sketch*, 12.

directly out of Bacon's *Advancement of Learning*. We would be correct in our analysis to treat Dury's words above as a second to Bacon's assurance regarding the knowledge of second causes, that

> [a]lthough […] [*t*]*he worke which God worketh from the beginning to the end* […] *is not possible to be found out by Man*; yet that doth not derogate from the capacities of the minde […] [f]or that nothing parcel in the world, is denied to Mans enquirie and inuention […] [for] [*t*]*he Spirit of Man is as the Lampe of God, wherewith hee searcheth the inwardnesse of all secrets.*[525]

Turnbull notes that, "[a]fter reading this, one can almost fancy Dury and Hartlib writing it in conjunction, so closely do certain parts of it resemble schemes advocated by Hartlib."[526] Taking this a step further, those "certain parts" have most likely been taken by Hartlib and Dury directly from Bacon's works.

In sum, while it is illuminating to note the influence of Bacon's practical approach to the inquiry into nature on Dury's irenic (and Protestant) pursuits, it is of even greater value to examine the influence of Bacon's moral precepts on Dury's work. As Dury recognises, the crucial prerequisite of individual goodness and moral virtue must be established before the natural inquirer embarks upon the practical endeavour of the interpretation of nature, so individual moral virtue must precede the practical endeavour of peace between societies. It is only when Man has achieved his own individual good that he may consider himself on an appetitive level with nature, which is to say, on an appetitive level with Creation. Only then can he truly invoke nature's secrets. For Dury, the natural state of individual goodness and virtue analogously enables the natural state of collective peace in and between societies; the Individual Good indeed provides for the Good of Communion. In both paradigms – natural philosophy and ecclesiastical peace – Man must acknowledge his postlapsarian position wherein he himself is a facet of creation rather than a divine incumbent imbued with plenipotentiary powers, as had been Adam.

5.4 Hartlib and Dury: the 1640s

The embarkation in earnest of Hartlib's campaign to promote Bacon's philosophy in the civil sphere begins in 1641. This year, a significant one in British history, is also significant for the Hartlib Circle, and, thus, to the eventual formation of the Royal Society in 1660. 1641 witnessed several significant events relative to the progress of their Baconian initiatives. The English Civil War begins in 1641, creating a unique situation in the world wherein an elected – and Protestant – body, the English Parliament, became invested with independent

[525] Bacon, *AL*, 6-7
[526] Turnbull, *Sketch*, 11.

delegatory political power. This development would prove a catalyst to Hartlib and his associates in their endeavour to transform the fruits and light of Bacon's philosophy into civil, political policy.

The Irish Uprising began in 1641, a conflict which precipitated an exodus of English plantation settlers back to England. Among these was Lady Ranelagh (1615-1691), Robert Boyle's sister, born Katherine Boyle, who, after being besieged at Athlone Castle, County Westmeath, Ireland, at last gained passage back to London in 1642.[527] Her return and settlement in London would be a crucial episode in the motions of the Hartlib Circle. Acquitting herself as an intelligencer almost on a par with Hartlib, she would pursue and cement her own social contacts and oversee introductions (not least of these would be her introduction of brother Robert to Samuel Hartlib). Her friendship with Dorothy Moore would bring the work of John Dury into Lady Ranelagh's London ambit.[528]

Certainly not least, the year 1641 would also see Gilbert Wats' English translation of Bacon's *De augmentis* from the Latin, published in 1640. As we have discussed, this was an important work in the esteem of Hartlib, Dury, and especially Czech educational reformer and Hartlib associate, Jan Amos Comenius. Bacon is an influential figure on all three, Dury and Hartlib in particular, by the start of the 1640s. Wats' translation of *De augmentis* would catalyse a renewed vigour in Bacon's integral role in their civil initiatives and political acitivities.

Turnbull affirms that Hartlib and Comenius had been corresponding since 1632.[529] We learn in a letter from John Johnston to Hartlib, dated August 1633, that a central concern at that time in the Hartlib-Comenius correspondence was "the promise [from Hartlib] of the manuscripts of Bacon," which "has touched Comenius much and that Comenius asks therefore that Hartlib will see to the matter as soon as possible by a safe hand."[530] Comenius arrived in England on 21 September 1641 (with Hartlib's assistance) with the intent of beginning assembly of his pansophic education project.[531] While he would not stay more than a few months, his brief presence marked a watershed moment of vigorous activity in the work of Dury and Hartlib. It also cemented Bacon as the cornerstone of their philosophical and practical endeavours. To wit, six years later, in 1647, Hartlib and Dury produced a text entitled *Considerations Tending to the Happy Accomplishment of Englands Reformation in*

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[527] *ODNB*, s.v. "Jones [née Boyle], Katherine, Viscountess Ranelagh [1615-1691]," by Sarah Hutton, 2004, https://doi-org.libproxy.york.ac.uk/10.1093/ref:odnb/66365.
[528] See Dimeo, *Lady Ranelagh*, *passim*; Moore, *Letter of Dorothy Moore*, *passim*; Pal, *Republic of Women*, *passim*.
[529] Turnbull, *HDC*, 342.
[530] Turnbull, *HDC*, 342.
[531] Turnbull, *HDC*, 354.

Church and State with the intention of submitting it to Parliament for political consideration. The confirmation of direct Baconian influence is provided in a section of the tract which enumerates the "Ends," or specified purposes for which the Warden of the Office of Addresse for Communications should apply his energies: "in Matters of Humane Sciences, the End of his Negotiation should be, 1. To put in Practice the Lord *Verulams* Designations, *De Augmentis Scientiarum*, amongst the learned."[532]

In March 1642, Hartlib, Dury, and Comenius signed a pact, a "*foederis fraterni ad mutuam*" which sealed their commitment to building the public good through the politicised precepts of Christian (Protestant) theology.[533] Anything but an instrument of dogmatic aggression, the pact codified their full morally-founded surrender to the monumental task of effective practical ecclesiastical education. In true Baconian fashion, the three individuals – and perhaps Dury, in particular – recognised the link not just between individual moral virtue and the good of Man, but between moral virtue and the practical acquisition of knowledge in all of its facets. Hartlib, Dury, and Comenius received Bacon's proviso that the inductive pursuit of natural philosophy must be accompanied by the goodness and cultivated moral virtue by which Man fulfils his epistemological role as a beneficent appetitive agent of creation.

In 1642, as an extension of the *foederis fraterni*, John Dury submitted *A Motion Tending to the Publick Good of This Age, and of Posteritie* […]. Samuel Hartlib published the tract that same year. Charles Webster elucidates that "the central part of the text consists of two letters written by Dury to Sir Cheney Culpeper, dated 6 and 13 January 1641-2" that were intended to "indicate the commitment of Hartlib and Dury to Comenius's educational program."[534] As we have noted, Comenius had, through the dedicated efforts of Samuel Hartlib, come to England in 1641 in order that he, Dury, Hartlib and others could embark on their plans to establish a school according to the precepts both of Comenius's pansophy and Bacon's advancement of learning.[535] Turnbull asserts that, for these individuals in 1641, "[n]ow [was] the time for the plans of Verulam to be heard and his wishes carried out."[536]

Dury's *A Motion Tending to the Publick Good* reveals his attempt to emulate the language and substance of Bacon's Great Instauration precepts and to apply them to the

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[532] John Dury, "Considerations Tending to the Happy Accomplishment of Englands Reformation," in *Samuel Hartlib and the Advancement of Learning*, 132. "The work is generally attributed to Hartlib, who was certainly responsible for the preface. However, the Hartlib-Dury correspondence makes it clear that the text was drafted by Dury." Charles Webster, in *Samuel Hartlib and the Advancement of Learning*, 119.
[533] See Turnbull, *HDC*, 458 ff.
[534] Charles Webster, in *Samuel Hartlib and the Advancement of Learning*, 98.
[535] Turnbull, *HDC*, 350 ff.
[536] Turnbull, *HDC*, 350.

advancement of ecclesiastical peace. The full title on its own indicates that Dury intends to elaborate on his own intentions, which are, in turn, inspired and contextualised by Bacon's work. Foremost is Dury's inclusion of the desired end of "Publick good" with the means of "Reformation in Learning and Religion." Dury's phrasing in the prescription that learning and religion "be advanced to some perfection" is fundamentally the language and philosophy of Bacon.

The precepts of Bacon's moral philosophy echo in the foundation of the introductory paragraph of *A Motion*. This important passage describes Dury's mission toward "the erecting of a professorship of Practicall Divinity in every University" with the proviso "[t]hat this Professor might intend besides the reading of Practicall matters the compiling of a complete body of Practicall Divinity taken out of all the Practicall writers of this latter age."[537] We note Dury's stipulation that the "body" of his Practical Divinity be informed not by religious writers per se, but by *practical* writers: Bacon would surely have been among them.

Further, the beneficence of humanity proves itself, as Dury writes, in posterity. Those working in the present serve the present best by working for future generations. This is fundamentally Baconian; it is Dury's analogous paradigm to Bacon's *Initiative* transmission to the sons of science. Dury asserts,

> No man can do good to Posterity, but he that doth know how to serve his own generation rightly. Nor can any man serve his owne generation as he ought, that knoweth not what his own felicity, and that of his generation is; and how it may be attained unto. For he that is destitute of this knowledge, can neither labour for himself to become truly happy, nor can he reach forth the means of happinesse unto others. For how can any impart unto another, that whereof he is not himself participant? A man then that would set forward the Publique Good, must first know, what it is to be truly good? By what means goodnesse is attained unto? And how it may be propagated into his generation? Of these there, I purpose to discourse a little, before I make the motion, which I intend to propose unto you.[538]

Prior to subjecting this passage to direct comparative analysis with Bacon, we might first note the text of the latter half. Here, Dury provides the criteria for his titular motion. In order for the public good to be achieved, men must first achieve goodness in themselves. This is only logical. Thus, the proposal seeks to put in place the civil means to establish an environment of individual goodness. Here, we note Dury's association of goodness with the notion of posterity; they are inextricably linked. Dury thus invokes the unique Baconian scheme whereby philosophy becomes *political* in the true semantic sense of that adjective. That is, philosophy must exist as a practical factor in the forces of material action which effect the

[537] See Dury, "A Motion Tending to the Publick Good," 21-22.
[538] Dury, "A Motion Tending to the Publick Good," 3.

beneficence of a *polity*. Dury, under Bacon's aegis of comprehensive reform, seeks to accomplish what the ancients and the scholastics could not, or at least, *would* not do. That is, to give real utilitarian weight and mass to philosophical precepts, to turn ideas into practical deeds and provide the material of natural histories that will "build up philosophy."[539] The very fact that this is the intent of *A Motion* conveys Bacon's influence on Dury and Hartlib, who were motivated not just by Bacon's precepts, but by the intention behind their entire delivery that these precepts be implemented. The beneficence of Man begins with individual appetitive moral virtue and proceeds to the civil moral knowledge of the collective. The Self-Good must inform the Good of Communion; the goodness of the individual provides the foundation for the policy of the community. In Dury's case, the philosophy of the human individual who is *of* the world created by God rather than a divinely-invested subordinate begets the policy of the community. To Dury, ecclesiastical peace and ecumenical harmony are projects which must be constructed by the hand of Man within the realm of second causes.

Continuing in our analysis, we note the resemblance of Dury's opening passage above to Bacon's opening passage in Book 2 of *The Advancement of Learning*, originally published in 1605 and later adapted as the Second Book of *De Augmentis* in 1623. Not only may we surmise that Dury is familiar with the work(s), we may further entertain the notion that Dury intends *A Motion* to be emulative of Bacon's precepts. Dury intends the opening as the fanfare which corresponds to Bacon's appeal to King James I/VI (this is the same specific Baconian text that Jan Comenius had been eager to re-submit as an appeal to Charles I on behalf of the new learning). Keeping Dury's text above close at hand, we note its resemblance to Bacon's. Bacon writes,

> It might seeme to haue more convenience, though it come often otherwise to passe, (Excellent King), that those which are fruitfull in their generations, & haue in themselues the foresight of Immortalitie, in their descendants, should likewise be more carefull of the good estate of future times; vnto which they know they must transmitte and commend ouer their dearest pledges.[540]

Bacon revised and added new material to the text in both books of the 1605 edition of *The Advancement of Learning* for their inclusion as the First and Second Books of *De augmentis* in 1623. However, this opening sentence of Book 2 remained unchanged in all of its published incarnations, including in Gilbert Wats' 1640 English translation of the original Latin. We are thus to believe that Bacon considered this motivational precept for human advancement to be a central philosophical and epistemological platform of the Great Instauration, as did his followers.

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[539] Bacon, *NO*, 157.
[540] Bacon, *AL*, 55.

Bacon's concern for the good of posterity underlies his entire project. If Bacon is concerned for posterity as it applies to the existing Christian world of Man which is, as of the Fall, once removed from the divine realm, Dury establishes posterity as an epistemological *and* political notion in his world of irenic and ecclesiastical harmony. We can compare Dury's discussion of posterity above to the following from Bacon in *De augmentis* (Dury surely would have been familiar with this concluding tract from *His Preface*). Bacon writes,

> Our Instauration is a matter infinite, and beyond the power and compasse of Mortality; *seeing it is in truth the right and legitimate end and period of* Infinite Errors *and not unmindful of Mortality, and Humane Condition, being it doth not promise that the* Designe *may be accomplisht within the Revolution of an Age only, but delivers it over to Posterity to Perfect.*[541]

Dury's introductory passage would thus seem a confirmative response to Bacon's elaboration of the individual's duty to ensure both his positive contribution to society and to posterity. The benefit provided by the advancement of knowledge to society and posterity begins at the same source and is the result of the same endeavour. Dury confirms Bacon's philosophy, which contends that the work toward the present relief of Man's estate and the work toward the proper care of future generations are not separate projects. As we have discussed above, Dury's (and especially Hartlib's) great innovation lies in their preparation (in league with Comenius) of this philosophy for submission to the formal civil sphere of government.[542] Further, as Dury recognises, the human work of ecclesiastical peace on behalf of God must be undertaken in the practical world of humanity, not in the unknowable realm of divinity.

Indeed, the beneficence to the present age is best secured by work on behalf of the beneficence to posterity. The foundation of the human art that enables this work is the appetitive material of goodness. Both Bacon's and Dury's notion of individual goodness is

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[541] Bacon, *OAPL*, 19-20.

[542] Charles Webster describes, "Hartlib provided a broad basis for parliamentary action by seeking the support of prominent figures of differing political outlooks, many of whom either became members of, or had strong indirect influence on the Long Parliament. From the bewildering range of Hartlib's correspondents it is difficult to isolate his most committed parliamentary supporters." Webster, "Introduction," *Samuel Hartlib and the Advancement of Learning,* 25. George Melvyn Ella describes Dury's own "access to Parliament both as a petitioner and preacher" beginning in 1640. In fact, it would seem to have been Dury who was first most well-placed to advance the initiatives of the Hartlib Circle in the new paradigm of political potential represented by the Long Parliament. Ella supplies us with the record of Dury's substantial formal submissions to that body: "In 1641, he [Dury] petitioned first the King and Parliament with *A Memorial concerning Peace Ecclesiasticall*: *To the king of England and the pastors and elders of the Kirk of Scotland meeting at St. Andrews* and *Petition to the Honourable Houst of the Commons in England now assembled in Parliament*; then *A Discourse concerning Peace Ecclesiasticall* and the year after [1642] *Petition to the House of Commons, for the Preservation of True Religion* and *Petition to the House of Commons*; *whereupon are added, certain Considerations, showing the necessity of a Correspondence in Spiritual Matters, between Protestant Churches* . . . These documents led to Dury being proposed as a member of the planned Westminster Assembly." George Melvyn Ella, *The Practical Divinity of Universal Learning: John Durie's Educational Pansophism*, (Eugene: Wipf & Stock, 2014), 72.

built upon the notion of posterity. Like positive and appetitive action, the good material which enables Man to dedicate his present efforts to posterity is inherent in nature, but it is not in Man, who must apply his art to the end of posterity just as he must to the cultivation of moral virtue. In fact, the latter work ensures the success of the former. In *A Motion*, Dury writes,

> [t]he object of God's wrath is nothing else but the life of lust in nature, *Ephes*. 2.3. For there we are said to be *by nature the children of wrath*, in respect that we have our conversation in the lust of the flesh, fulfilling the desires of the flesh and of the minde. Now we know that our flesh and fleshly minde doth embrace only this present world, of which we are taught, that all that is in the world, is but the object of lust, and of pride in lust.[543]

Dury contends that work done by humans without a moral view to posterity can never achieve a higher status than that of lust and pride. Providing for posterity, which describes the appetitive motion of individual goodness, is the nearest Man can get to observing both the eternal existence of God and the immortality Man himself has lost in the Fall. We have previously noted that in the Sixth Book of *De augmentis*, Bacon observes that the **"**preheminence of the *Active Good*, is infinitely exalted from the consideration of our humane condition, that it is mortal, and also exposed to the stroak of fortune." [544] However, Dury, like Bacon, contends that Man must deliver more than the active fruits of propagation to posterity. A mind which embraces only the present world is only giving itself to a sort of lust.

Bacon illustrates the means by which postlapsarian humanity must pursue his immortality and thus confirm the proof of his moral integrity: "*opera eorum sequuntur eos*."[545] This statement can be interpreted two ways. The first indicates that the works of Man follow his efforts to achieve those works, and thus both efforts and works are equally worthwhile. However, in the second sense, Bacon provides that the works of Man make him immortal in a way that his own life cannot. As long as Man's works remain, they continue to *follow* him – or, rather, he continues to lead them – even though he himself has gone. Man becomes eternal through his works. Thus, like his goodness, Man's postlapsarian immortality is the product of his own discipline and his own energies. In Bacon's view, and in Dury's, Man should not expect to produce eternal works, only productive knowledge. The knowledge of his works, both *fructifera* and *lucifera*, secures not only the immortality of the work itself, but also proves the worth of his goodness in the realm of posterity. Thus, the paradox is that his works *follow* the man even though he perishes and leaves the work, which itself will not last as long as the knowledge of it will. Humanity must use the tactile opportunity to obtain

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[543] Dury, "A Motion Tending to the Publick Good," 4.
[544] Bacon, *OAPL*, 342.
[545] Bacon, *OAPL*, 342. "Their works follow them." Translation mine.

knowledge and achieve works in the present in order to provide for a future to which, like Divinity itself, it is bound but on which it cannot speculate.

5.5 Conclusion

If the surviving body of Samuel Hartlib's correspondence provides a view of his part in the philosophical and experimental environments in the immediate post-Bacon era, it also reveals the same of everyone with whom he is involved as well. Mark Greengrass, Michael Leslie, and Timothy Raylor describe the saga of Hartlib's papers and their discovery by Turnbull, who "[had] been alerted to the existence of a trunk full of manuscript papers in a solicitor's office [neither the solicitor's name is nor his office is given] in London in 1933."[546] While, as the three co-authors note, "what Turnbull found in 1933 […] was far from the totality of Hartlib's papers," the surviving and/or as-yet discovered documents provide a view to the philosophical and epistemological fellowship which joined Hartlib and Dury.[547] In addition to evidence contained in first-hand surviving epistolary documents, we are able to discern Hartlib's Baconian influence through his publication and promotion of the manuscripts of others. We are also provided access to the works of many individuals which, without Hartlib's efforts, may never have been made available. Gabriel Plattes' *Macaria* and Gerard Boates' *Irelands Naturall History*, for example, were not only supported and circulated, but published by Hartlib.[548] These works share the common bond of a foundation in Bacon's philosophy. If Hartlib's investment in those individuals testifies to the active esteem in which he held them, it also reveals the admiration he reserved for Bacon's philosophy.

Hartlib and Dury are the most notable of Bacon's early advocates. Joined by Baconian influence, especially in their endeavour to establish the school at Chichester in the late 1620s, the association between Hartlib and Dury comprises the original core of what will become known as the Hartlib Circle. That group, and especially Hartlib and Dury, found Bacon's epistemology the fitting guide to their own endeavours of educational, irenic, and ecumenical reform, all of which were to be built according to the working epistemology of Bacon's

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[546] Greengrass, Leslie, and Raylor, "Introduction," in *Samuel Hartlib and Universal Reformation*, 4-7.
[547] Greengrass, Leslie, and Raylor, "Introduction," in *Samuel Hartlib and Universal Reformation*, 7.
[548] For an illuminating discussion on the saga of the Boates' (both Gerard *and* Arnold) *Irelands Naturall History*, see Webster, *WGI*, *passim* and especially pp. 428-435. Also, Jeremy Fradkin cites "[John] Dury's dramatic dedicatory epistle to *Irelands Naturall History*" as evidence of that work's stature "as both a major development in Baconian economic geography and as a manifesto for the Anglo-Irish Protestant lobby in London." Fradkin, "Protestant Unity and Anti-Catholicism," 281-282. For particularly engaging research on Gabriel Plattes' Baconian approach to husbandry, see Oana Matei, "Gabriel Plattes, Hartlib Circle and the Interest for Husbandry in the Seventeenth Century England," *Prolegomena* 11, no. 2 (2012): 207-224; Oana Matei, "Husbanding Creation and the Technology of Amelioration in the Works of Gabriel Plattes," *Society and Politics* 7, no. 1 (13) (April 2013): 84-102 ; Oana Matei, "*Macaria*, The Hartlib Circle, and Husbanding Creation," *Society and Politics* 7, no. 2 (14) (November 2013): 7-33.

philosophy. This is evident from the moment these two individuals began their correspondence in 1627-1628.[549]

While Hartlib was the first primary disseminator of Bacon's philosophy after 1626, analysis of primary sources both epistolary and literary suggests that, especially as pertains to the Hartlib Circle, John Dury was certainly himself, in concert with Hartlib, amongst the first committed Baconians. It is Dury's operatively irenic and ecclesiastical texts, which are politicised and pointed toward real action, that exhibit the deep and inveterate foundation of Baconian influence. It is important to re-affirm here that neither Dury nor Hartlib were practitioners of natural or experimental philosophy. Their mutual attraction to Baconian precepts was rooted to a great extent in Bacon's practical and morally based epistemology, which they sought to apply to a far wider societal project than natural inquiry.

In Dury's work, and Hartlib's dissemination and sponsorship of that work, the reader beholds Bacon among the foundations of his (Dury's) intellectual, practical, and theological platforms. For Bacon, the material of (postlapsarian) individual goodness would actually seem to precede the human condition of piety and the human engagement with theology rather than the other way around. We encounter this scheme in the work of John Dury. In *A Motion Tending to the Publick Good*, Dury writes that "a man is first natural, and then spirituall."[550] Considering Dury's own faith, this is an extraordinary assertion. His scheme for the reform of education in "endeavors of Ecclesiastical Pacification" requires that moral virtue, its epistemological roots in the realm of appetitive material goodness, serve as the prepotent impetus for action as it had in Bacon's natural inquirer.

In the 1630s and early 1640s, Dury and Hartlib are not alone in their commitment to an irenicism based in civic peace and a pan-European ecumenical, Protestant harmony. Dury ascribes to the Baconian acceptance of the postlapsarian lot of humanity, which stipulates that Man, not God, is responsible for the husbandry of his (Man's) morality. Thus, as Man's deliberate cultivation of moral virtue enables the positive intellectual powers in the proper interpretation of nature, so that cultivation makes possible Man's assembly of his own peaceable kingdom.

In sum, Bacon's work is carried through the 1630s most concertedly by Dury and Hartlib. These two individuals, who are not only *not* landed gentlemen, but in fact are men without countries, have kept the name *Verulam* vibrant in their correspondence and published texts. It is they who affirm Bacon's importance to Comenius and reinforce the Baconian substance of the pansophist campaign for the advancement of education and peace between

[549] Turnbull, *HDC,* 128 ff.
[550] Dury, "A Motion Tending to the Publick Good," 21.

Protestant sects. More importantly, it will be Hartlib in particular who presents the young and seeking Robert Boyle to the moral exercise of Bacon's natural philosophy.

Chapter 6: The Baconian Genesis of Robert Boyle's Experimental Practice

6.1 Robert Boyle's Baconian Evolution

I have thus far examined the reception of Bacon's philosophy by Samuel Hartlib and the Hartlib Circle beginning in the late 1620s. As my inquiry endeavours to identify *which* aspects of Bacon's philosophy were absorbed by *which* of Bacon's posthumous followers, I find, as in the case of Samuel Hartlib and his associates, that Bacon's initial influence landed well-outside the realm of scientific practice and methodology. Samuel Hartlib and John Dury, neither of whom were natural philosophers, nonetheless enthusiastically responded to and adopted specific precepts of Bacon's philosophy and its emphasis on aphorisms, which, as Hartlib remarks, "cannot bee made but of the pyth and heart of Sciences." [551] As we have seen in Chapter 5, both Hartlib and Dury considered Bacon's precepts to be crucial factors to the progress of institutional education and ecumenical irenic unity.

Robert Boyle would be attracted to Bacon's moral epistemology, as well as the latter's aphorism-focused methodology which, in the Aristotelian fashion, begins with the prefatory consultation of all applicable natural histories.[552] By 1650, Boyle would redirect his initial occupational endeavours in the composition of moral and ethical literature directly toward the pursuit of experimental philosophy. For him, as for Bacon, moral and natural philosophy were not separate or exclusive pursuits. Epistolary evidence suggests that Boyle was particularly encouraged to become familiar with Bacon's philosophy by Samuel Hartlib beginning in the mid-1640s. While we find it difficult to assess the degree to which Boyle may have been exposed to any of Bacon's works before his introduction to Hartlib (it is highly likely that he was), he (Boyle) had certainly responded to Bacon's influence after his direct association with Hartlib began in early 1647.[553] Bacon himself was not an experimental practitioner per se, nor

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[551] *HP*, [7/12/2A ff.], dhi.ac.uk/hartlib/context.

[552] See Rose-Mary Sargent, "Learning from experience: Boyle's construction of an experimental philosophy," in *Robert Boyle Reconsidered*, ed. Michael Hunter (Cambridge: Cambridge University Press, 1994), especially pp. 58-59. "Boyle followed Bacon's new 'physical logic' that inverted the order of discovery and proof. Instead of beginning with speculations about the universal causes that may be operative in nature, philosophers should first compile a vast amount of information about natural effects in order to discover 'how things have been or are really produced.'"

[553] According to surviving epistolary evidence, Hartlib became known to Boyle's sister Lady Ranelagh at the very latest in 1645 through the actions of Dorothy Moore. G.H. Turnbull records that in a letter dated "February 11/21 [1645], Mrs. Moore, who was about to marry [John] Dury, wrote asking Lady Ranelagh to recommend Hartlib for support to most pious and able members of Parliament." Turnbull, *HDC*, 27. See also John J. O'Brien M.A. B.Sc., "Samuel Hartlib's Influence on Robert Boyle's Scientific Development," in *Annals of Science* 21, no. 1 (1965): 1-14.

was Robert Boyle when the latter began his regular correspondence with Samuel Hartlib in 1647. Bacon's influence on Boyle stems from the former's precepts regarding the useful exercise of human goodness and moral virtue. Boyle's own immersion in experimental practice begins as a moral pursuit based on his own religious and charitable convictions.

Samuel Hartlib appears to have played a singularly crucial role in supplying a Baconian emphasis to Boyle's nascent approach to experimental philosophy in the mid- and late-1640s. It was Hartlib who persuaded Boyle to compose what would be his (Boyle's) first tract in the vein of natural philosophy meant for publication.[554] We must therefore use caution in reading such analysis as submitted by Margery Purver which demarcates "the essential differences between Bacon's concept[s]" and "[t]he 'pansophic' schemes of Hartlib and his collaborators."[555] Purver is correct to differentiate between the pansophic schemes of the Hartlib circle and the specific methodological practices of what we might loosely categorise as the practice of natural inquiry. However, Bacon's philosophy does not pretend to be a work of methodological guidance in the empiricist school. Bacon's Great Instauration is a project devoted to the progress and improvement of both the human individual and the collective of humanity to the end of properly assessing natural phenomena on behalf of attaining and retaining useful knowledge. In *Novum organum* (which, incidentally, Purver reminds us, had "left [Hartlib, Dury, and Comenius] baffled and disappointed") Bacon himself rails against rigid empiricism, warning that

> the *Empirical* family of philosophy has begotten tenets more deformed and monstrous than those of the *Sophistical* or rational family; because it does not base itself on the light of common notions (which, though it be faint and superficial, is still in a way universal and bears on many things) but on the darkness and narrowness of a handful of experiments.[556]

We again remind ourselves that, until Robert Boyle adopted Bacon's model for natural inquiry in the late 1640s, none of Bacon's adherents were hitherto natural or experimental philosophers, much less empiricists. Thus, for whatever disappointment Hartlib, Dury, and Comenius may have been dealt by *Novum organum*, they have shown that Bacon's philosophy, in actuality, defends and acquits itself in the area of pansophic projects. Its overriding purpose, more than any other, is to establish the human individual as a manifest and universal instrument of knowledge acquisition. This is the nature of the influence that inspired Robert Boyle.

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[554] See below, chapter section 6.6, "Conclusion: Empericus, Boyle's First Pupil."
[555] Margery Purver, *The Royal Society: Concept and Creation* (London: Routledge, 1967), 196.
[556] Purver, *The Royal Society: Concept and Creation*, 197; Bacon, *NO*, 101.

I argue that Boyle sought to execute his work in conscious accordance with Bacon's philosophical, epistemological, and even methodological guidance and further, to make his contribution to the natural histories according to Bacon's prescriptions for that particular task.

Interestingly, John Harwood argues that, for historians, Boyle the well-known experimental practitioner has, for a long time, stood rather alone in an amorphous wilderness regarding the nature of his legacy. Harwood notes that only through relatively recent historiographical assessment has Boyle been unequivocally assigned his place in the history of science, let alone as a Baconian practitioner. Harwood reminds us that even in the first decades after his death, Boyle's reputation was as much defined by his renown as a moral figure in close concert with his experimental legacy. Harwood cites Samuel Johnson's inclusion of Boyle with "Hooker, Bacon, [and] Milton" in the "Preface" of his (Johnson's) *Dictionary of the English Language* (1755) with an elite cohort of seventeenth-century luminaries who were (in Harwood's words) "propagators of knowledge, and teachers of truth."[557] Harwood makes the astute (and somewhat surprising) observation that "[m]odern scholars seldom consider those authors together, so Johnson's linkage suggests how Boyle was regarded a half century after his death. His reputation in the history of science is [only now] quite secure […]. What may not be noticed, however, are the connections between his natural philosophy and his moral philosophy."[558] It is within this epistemological context of a unified natural and moral philosophy that the chapter examines the influence of Bacon's provisions for utilitarian goodness on Boyle's life and work, including the formative years of the latter's experimental philosophy and practice.

Boyle does not appear to have begun the approach to his experimental identity in earnest until after his initial correspondence with Hartlib in 1647. It would have been at that time that Hartlib most likely would have first emphasised the importance of Bacon's utilitarian philosophy to Boyle. Harwood himself has "found nothing about [Boyle's] childhood or adolescence that indicated a special interest in or aptitude for natural philosophy."[559] This study's conclusions about Boyle's early motivations are based on selections of his literary and epistolary texts which date from the mid-1640s. Texts from that time reveal that his attentions were increasingly drawn away from literary exposition on ethics and directed toward experimental pursuit, and, importantly, that there was no philosophical gap separating his motives. Boyle, in fact, shows signs of having been motivated to seek the

[557] John T. Harwood, "Introduction," in Robert Boyle, *The Early Essays and Ethics of Robert Boyle*, ed. John T. Harwood (Carbondale: Southern Illinois University Press, 1991), xv.
[558] Harwood, "Introduction," xv-xvi.
[559] Harwood, "Introduction," xxiii.

active life of natural philosophy in no small measure by Bacon's precepts for the practice of natural interpretation and experiment defined by an inductive methodology which proceeds according to the goodness and moral virtue of the practitioner.

6.2 Reports and Echoes of Francis Bacon in Boyle's Writing

In 1661, Boyle published *Certain Physiological Essays*. The work comprised, as Boyle himself included in the title, "TRACTS Written at distant Times, and on Several Occasions."[560] Michael Hunter notes that the pieces contained in the collection originate in the 1650s during Boyle's residency in Oxford and that they represent "the key composition of Boyle's Oxford period."[561]

The essays appear one year on from the formal establishment of the Royal Society in 1660 and only a few months before the granting of a royal charter in early 1662 by newly restored Charles II. We might thus infer that Boyle deemed these works to be appropriate inaugural submissions befitting the times of the Restoration and the Royal Society, an era ripe with the promise of a formal, institutionalised, and *socialised* environment of public science.[562] Moreover, 1661 would be the year that preceded Boyle's submission of his eponymous law regarding the inverse relationship between the pressure and volume of gas to publication. I argue that this particular time marks the beginning of Boyle's later period, that is, the period of his experimental fame and success. For historians of science such as Steven Shapin and Simon Schaffer, it marks Boyle's confirmed assumption of the identity that would define his place in the history of science. Coincidentally, the year 1660 marks the year that Bacon's philosophy entered, via the Royal Society, an environment of formal sanction and acceptance (a discussion of Thomas Sprat's *History of the Royal Society*, published in 1667, follows below). As Shapin and Schaffer note, Boyle's air-pump – the *machina Boyleana* – was constructed by "the instrument maker Greatorex and, especially, by Robert Hooke in 1658-1659."[563] Indeed, in 1661, Boyle had only been a dedicated experimental philosopher and practitioner for just over ten years. Over the following thirty years until his death in 1691, he would cement his scientific reputation both in his own time and in posterity. He would be as well-known for his output of *experientia literata* and his *interpretatio naturae* as he would be for his actual experiments.

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[560] Robert Boyle, *The Sceptical Chymist and Other Publications of 1661*, in *The Works of Robert Boyle*, Vol. 2, eds. Michael Hunter and Edward B. Davis (London: Pickering & Chatto, 2018), 3.
[561] Boyle, *The Sceptical Chymist*, xi.
[562] Jackson I. Cope and Harold Whitmore Jones, "Introduction," in Thomas Sprat, *History of the Royal Society*, eds. Jackson I. Cope and Harold Whitmore Jones (London: Routledge & Kegan Paul Ltd, 1959), xiii.
[563] Shapin and Schaffer, *Leviathan*, 26.

Boyle's entry into the Royal Society-era of his career marks both the beginning of his later period and, moreover, the end of the emulative stage of his progress. He had begun the original work that would make his indelible mark on the world of natural inquiry and future science. His sense of scientific purpose, having evolved, or rather continued, directly from his original endeavours in philosophy and (Christian) ethics, remained rooted in his piety. His writings of the mid and late 1650s reveal how he himself assessed his formative years. These writings are possessed of a clarity and perspective that are invaluable. Importantly, during this time, we see his appreciation of Bacon turn to collegial admiration.

Boyle's writings composed in the late 1650s provide illuminating evidence of a longstanding intent to expressly invoke Bacon both in his (Boyle's) experimental and literary work. In 1647, Boyle's texts, two to three years before his full conversion to experimental philosophy and practice, imply the influence of Bacon's – and others' – philosophy and epistemology rather than explicitly cite it.

In 1657, by comparison, in such works as "A Proemial Essay," one of Boyle's *Certain Physiological Essays*, published in 1661, Boyle now explicitly invokes and singularly credits Bacon.[564] "A Proemial Essay" takes the form of a direct first-person address to Boyle's fictional pupil, *Pyrophilus* (we recall Bacon's fictional pupil in *The Masculine Birth of Time*). In the "*Advertisement* to the Reader" which precedes "A Proemial Essay," Boyle reveals that *Pyrophilus* is, in fact, "Mr *Richard Jones*, only Son to the Lord Viscount *Ranelagh* and an Excellent Lady, Sister to the Author."[565] The Lady is, of course, Lady Ranelagh, Katherine Jones, née Boyle. She had been and would remain his lifelong confidant, and, not least, she had also been the initial liaison between the young Boyle and Samuel Hartlib in the mid-1640s.

As we have noted, Shapin and Schaffer minimise the connection between Bacon and Boyle. They infer as evidence the dissimilarity of Boyle's "experimental narratives" to Bacon's "aphorisms."[566] We find instead that Boyle, in his experimental narratives, makes the conscious attempt to, in his own way, further Bacon's aphoristic program of knowledge transmission. Shapin and Schaffer leverage their claim, as has Larry Laudan, on the assumption that *Novum organum* (1620) was the prepotent, if not exclusive, source of Bacon's influence on future practitioners, including Boyle. Hartlib, Dury, and Comenius were

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[564] While Boyle does not expressly provide the year in which he composed *A Proemial Essay*, he reveals, (as Michael Hunter also indicates in the "Introductory Notes," xi) that it was "penned about four years since" its publication date of 1661, viz., 1657. See Boyle, *The Works of Robert Boyle*, *Volume 2* (eds. Hunter and Davis), 5.

[565] Boyle, *The Works of Robert Boyle*, *Volume 2* (eds. Hunter and Davis), 6.

[566] Shapin and Schaffer, *Leviathan*, n. 85, 63.

inspired to a greater extent in the realm of practical application by *De augmentis* (1623). They had been particularly enthusiastic about the edition translated into English and published by Gilbert Wats in 1640.[567] However, for Boyle, as we encounter below, Bacon's philosophical and epistemological impact extended far beyond *De augmentis*. In "A Proemial Essay," he reveals his experimental origins to *Pyrophilus*:

> The next thing, *Pyrophilus*, of which I am to give you an account, is, why I have in the ensuing Essays deliver'd many Experiments and Observations, which may seem slight and easie, and some of them obvious also, or else perhaps mention'd by others already. To satisfy you about this, I must inform you that many of the Particulars which we are now considering, were in my first Design collected in order to a Continuation of the Lord *Verulam's Sylva sylvarum* [published posthumously in 1627, with *New Atlantis*], or Natural History. And that my intended […] Centuries might resemble his, to which they were to be annex'd.[568]

In the context of this passage, the year Boyle composed "A Proemial Essay" (1657) bears emphasis because it predates the founding of the Royal Society by three years. By comparison, Thomas Sprat's *History of the Royal Society*, published in 1667, a full decade after Boyle had written "A Proemial Essay," would be a work commissioned by the Royal Society. It conveys, by deliberate design (to borrow Boyle's word above), a tribute to Bacon's philosophy and epistemology that the Royal Society has concertedly adopted as their philosophical foundation and epistemological inspiration. *The History of the Royal Society* is a myth of origin that retroactively presents the founding members in 1660 as having shared the conscious aspiration to implement and institutionalise Bacon's precepts (a myth indeed based in truth). Thus, Bacon's influence, as of 1660, is not novel; his philosophy has become, in a word, popular. In 1660, he has become an officially adopted and celebrated figure not just for his philosophy and fiction (viz., *New Atlantis*), but for his epistemology and methodology as well.

Though the work of one author in the strictest sense (Sprat), *The History of the Royal Society* was, during its composition, subject to "the careful scrutiny of some of the chief members" of the Society.[569] By 1662, Bacon has indeed become a posthumous icon, the *de facto* and *de jure* recipient of the civil and political collective assent against which he had written so vociferously.[570] Bacon's "ascension" would occur three years after Boyle's *Proemial Essay*. Thus, through that essay, we are provided both a last view of appreciation

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[567] Webster, "Introduction," *Samuel Hartlib and the Advancement of Learning*, 32.
[568] Robert Boyle, "A Proemial Essay, Wherein, With some considerations touching *Experimental Essays* in General, Is interwoven such an Introduction to all those written by the Author, as is necessary to be perus'd for the better understanding of them," in Boyle, *The Works of Robert Boyle, Volume 2* (eds. Hunter and Davis), 17.
[569] Cope and Jones, "Introduction," *History of the Royal Society*, xiii.
[570] The Royal Society received its royal charter from Charles II in 1662. See Cope and Jones, "Introduction," *History of the Royal Society*, xii-xiii.

dedicated to Bacon by Boyle prior to the former's full sanction of epistemological recognition via the Royal Society after 1660, *and* an appreciation bequeathed by Boyle prior to *his* ascension.[571] Analysis suggests that, in fact, Boyle himself might well have been a convincing source of Baconian influence in the formation of the Royal Society.

6.3 Early Epistolary Markers of Boyle's Experimental Beginnings, 1646-1647

Boyle's acknowledgement of his debt to Bacon in the "A Proemial Essay" warrants the search through the former's experimental beginnings for first-hand evidence of Bacon's influence.[572] That evidence is, admittedly, difficult to come by. Boyle, like Hartlib and Dury, would have certainly been aware of Bacon's philosophy at least on a passing level. I believe that Boyle would have also noticed, at his young age, Bacon's unique provisions regarding the human moral discipline required to engage in meaningful natural inquiry. In fact, Boyle's attraction to that discipline likely preceded, or at least accompanied, his attraction to experimental practice itself. His inclination toward experimental inquiry seems to have first appeared after his settlement at Stalbridge in early 1645.

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[571] Peter Anstey and Michael Hunter have provided crucial analysis of Boyle's Baconian influence in their article "Robert Boyle's 'Designe about Natural History'," *Early Science and Medicine* 13, no. 2 (2008): 83-126. The title of the article expressly refers to a letter dated 13 June 1666 from Boyle to Henry Oldenburg. This letter contains Boyle's own plan to construct a Natural History, the first epistemological step of effective natural inquiry. Anstey and Hunter preface their study with an assessment of Boyle's epistemological and methodological progress in the first years of the Royal Society era: "It was around this time [of Boyle's letter to Oldenburg] that Boyle became preoccupied to an extent which had not been the case earlier in his career by a method for systematically organising data which claimed to have learned from Bacon. His earliest writings . . . do not owe any special debt to Bacon, though generalised statements of a Baconian rationale for his work appear in such writings as *Certain Physiological Essays* (1661) [of which "A Proemial Essay is one]. In such [later] works as his *New Experiments and Observations touching Cold* (1665), however, he adopted a self-consciously Baconian method. As we will here argue, the letter to Oldenburg elaborated in a sophisticated way the salient Baconian doctrine which thereafter formed the centrepiece of Boyle's methodology in natural philosophy, informing both his practice and his published output." (Anstey and Hunter, "'Designe'," 84); See original document: Robert Boyle, "Remarks About Natural History in the Form of a Letter to Henry Oldenburg, 13 June 1666." *The Robert Boyle Project*, BP 25, pages 1-18. Birkbeck, University of London, https://www.bbk.ac.uk/boyle/papers/volume-25/: Boyle writes, "The division of natural history into that of Generations[,] Pretergenerations[,] and Arts introduc'd by your illustrious Verulam, I do not disprove." (BP 25, pp. 14-15); Rose-Marie Sargent's analyses Boyle's Baconianism in terms of his (Boyle's) distance from Descartes' *a priorism* and the misleading over-emphasis on Boyle's Cartesian corpuscular philosophy, which Boyle considered, according to Sargent, "to be a hypothesis." (475) In fact, Sargent argues, "[the] extreme generality of Boyle's corpuscularianism – where matter is made up of tiny particles in various configurations either in motion or at rest – would indicate that Boyle's corpuscular philosophy was more akin, perhaps, to the Baconian than to the Cartesian notion. Bacon, for his part, had favored a vague and general notion, stressing only the need for investigations into 'latent configurations' of bodies which are made up of 'things too small to strike the sense'" (*The New Organon, Bk. 2, VI-VIII*, pp. 126-127). Rose-Marie Sargent, "Robert Boyle's Baconian Inheritance: A Response to Laudan's Cartesian Thesis," *Studies in History and Philosophy of Science* 17, no. 4 (1986): 475; Cf., Laurens Laudan, "The Clock Metaphor and Probabilism: The Impact of Descartes on English Methodological Thought, 1650-65." *Annals of Science* 22, no. 2 (June 1966): 73-104. https://doi.org/10.1080/00033796600203065.

[572] In the discussion of Boyle's *The Christian Virtuoso* below in this chapter, we will see that Boyle would look back on his debt to Bacon's influence both in methodology and philosophy with clarity until the end of his life.

In these early days following his return from the Continent, Boyle's intentions as revealed in his correspondence do not predict his full entry into the life of experimental practice at the outset of the 1650s. However, joined with the benefit of hindsight gleaned from his later writings, we notice the primordial substance of his Baconian experimental future in his early communications, especially with Samuel Hartlib.

Boyle's first communiques with Samuel Hartlib in early 1647 reveal a great deal about the philosophical commitments of both correspondents in their respective endeavours under the aegis of Baconian epistemology. We have seen in the previous chapter that Hartlib has championed Bacon since, at latest, the late 1620s. Hartlib also appears to have been one of, if not the first, of Boyle's "colleagues" in the years of the latter's nascent pursuit of natural philosophy. Until 1647, Boyle's communications in matters dear to him were limited almost entirely to family members and close family acquaintances such as his Grand Tour chaperone, Isaac Marcombes and, not least, Lady Ranelagh. Michelle DiMeo emphasises the moral influence held over Boyle by Lady Ranelagh. DiMeo correctly steers us to the fact that, from Boyle's early days, "Lady Ranelagh was not only a driving force behind [Robert's] ethical treatises, but also a source of feedback."[573] She would continue as such through the whole of Boyle's life. R.E.W. Maddison provides further crucial testimony relative to Lady Ranelagh's involvement in Boyle's catalytic acquaintance with Hartlib:

> [f]rom the point of view of their undoubted influence on Robert Boyle, it is of considerable interest to consider the friends, acquaintances, and certain family relationships of his sister Katherine, Lady Ranelagh at this time. She was the niece of Mrs Dorothy Moore, who married John Dury in 1645; she was also the sister-in-law of Sir John Clotworthy (afterwards viscount) and his wife Margaret. These four individuals had been known to Samuel Hartlib for some years, and so Robert Boyle's acquaintanceships became extended into Hartlib's circle.[574]

Despite the important role played by Lady Ranelagh in Boyle's pursuits, it is only when he begins his correspondence with Samuel Hartlib that his ethics find epistemological and practical traction in the realm of natural philosophy and experiment. It is most likely through Hartlib's efforts that Boyle's own ethical sensibilities will find further affirmation in Bacon's provisions for the moral and intellectual conditioning of the practitioner.

Though the epistolary records of Boyle and Hartlib are not complete, we may still pinpoint the beginning of their direct correspondence. Charles Webster notes that "in March 1647 [Boyle] was introduced to Hartlib," and this assertion remains supported by surviving

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[573] DiMeo, Michelle, *Lady Ranelagh: The Incomparable Life of Robert Boyle's Sister* (Chicago: The University of Chicago Press, 2021), 50.
[574] Maddison, *Life of the Honourable Robert Boyle*, 61.

documents.[575] However, it is not only the dates affixed by the authors to their correspondence documents that reveal the intellectual event of their meeting. It is also the ethos, tone, and subject matter, especially in Boyle's communications, that indicate his conscious choice to embark on a life of experimental practice. Hartlib would thus surely have directed him toward Bacon at the outset of their correspondence.

The first clear epistolary evidence of Boyle's intended trajectory toward natural philosophy appears in a letter to Isaac Marcombes, Boyle's companion and chaperone throughout the latter's travels on the European continent. Dated 22 October 1646 (Boyle would have been nineteen years old), the greater balance of the letter addresses the current events surrounding the English Civil War and "my lorde of *Ormonde's* peace with the Irish," proceedings which are of equal importance and immediacy to the Boyle family.[576] However, in closing the letter, Boyle refers to the new pursuits he has undertaken to supplement his primary activity of literary ethical analysis. He writes that "[t]he other humane studies I apply myself to, are natural philosophy, the mechanics, and husbandry, according to the principles of our new philosophical college, that values no knowledge, but as it hath a tendency to use."[577]

Boyle's words and tone in his announcement to Marcombes anticipate the enthusiasm of his communications with Samuel Hartlib, which would begin in early 1647. However, in October 1646, the time of Boyle's letter to Marcombes, Boyle had likely been introduced to either the man or the reputation of Hartlib through Lady Ranelagh. The concept of useful knowledge is, in 1646, not only still a novel concept, but, as such, all but uniquely Baconian. If Boyle was not yet fully conversant in Bacon's philosophy at the time of his letter to Marcombes, he would become so in his correspondence with Hartlib.

The month of March 1647 appears pivotal in Boyle's progress to the identity and practice of experimental philosopher. The joining of his proclivities for ethics and for natural philosophy is evinced in the comparison of two specific letters. The first, dated 6 March is,

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[575] Webster, *WGI*, 61.

[576] Boyle, *Bcorr*, 37. I reiterate here that Boyle, his sister Lady Ranelagh, Hartlib, Dury, Dorothy Moore (Dury), Comenius, and many others, had been cast out of their routines of societal or class norm by extraordinary events in England and in Ireland. It was as a participant in such unsettled milieux, and perhaps *because* of them, that Boyle would become interested in natural inquiry. This study contends that Bacon's philosophy was attractive to those for whom, amongst other deprivations, the conventions of communitarian consent and collective sanction had either been interrupted or had become non-existent. As analysis illuminated earlier in the chapter, Bacon's philosophy before 1660 was circulated and promoted only by dedicated followers. With its emphasis on the scheme wherein civil, or social, morality could only succeed subsequently to the success of individual moral virtue (as in the honey-bee metaphor discussed in Chapter 3), Bacon's precepts would indeed have served as guides to those deeply in the dark.

[577] Boyle, *Bcorr*, 42. Much scholarship has been devoted to what, and who, Boyle's "philosophical college" was. I address this below, though the topic remains slightly peripheral to my current inquiry.

unsurprisingly, to Lady Ranelagh. Boyle describes to his sister the unfortunate condition in which his "great earthen furnace, whose conveying hither has taken up so much of my care, and concerning which I made bold very lately to trouble you, since I last did so, had been brought to my hands crumbled into as many pieces, as we into sects."[578] Boyle's sardonic reference to the splintering of Civil War-era England into socio-political and religious "sects" like the broken pieces of his furnace is as close as he comes at this stage to providing a spiritual context of experimental philosophy. He acknowledges his experimental intentions for the furnace, which lean more toward his "useful" (i.e., chemical, economic, and political) interests in gun powder than toward the greater advancement of learning.[579] Again, if Boyle has been introduced to Bacon's natural philosophy, he makes no reference to it in this particular correspondence. At the close of the letter, we do see Boyle demonstrate his fealty to the Protestant virtue he shares with his sister:

> Seriously madam, after all the pains I have taken, and the precautions I have used, to prevent this furnace the disaster of its predecessors . . . that I may after all this receive it broken, is a defeat, that nothing could recompence but that rare lesson it teaches me, how brittle that happiness is, that we build upon earth.[580]

Boyle's acknowledgement of the brittleness of earthly happiness is, in the Baconian sense, unsophisticated. There is no mention in Boyle's text of charity or moral duty, certainly not that could be traced to Bacon's philosophy. Further, Boyle offers no clue as to his original motivation to acquire an intended purpose for the now-broken furnace. We are not informed as to whether it was to be tool, toy, or virtuosic pastime. The worlds of physics and postlapsarian Christian morality appear as yet disjoined, two distinct issues to be addressed with their respective apposite instruments: the furnace for experiment and the pen for moral ethics. We encounter no allusion to the "useful knowledge" as we have in the letter to Marcombes the previous October.

However, Boyle will soon and quite rapidly bridge his own epistemological gap between experiment and virtue. With Boyle's letter to his sister in mind, we proceed to what appears to be his earliest correspondence with Hartlib, dated only as "early 1647" by Michael Hunter.[581] Boyle writes,

> I am sure, that you have too much *charity* to want justice; and therefore on the score of your serious promise I am bold, not only to desire, but to expect at your hands a

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[578] Boyle, *Bcorr*, 50.
[579] See "Boyle to Benjamin Worsley [after 21 November 1646]," in Boyle, *Bcorr*, 42-44.
[580] Boyle, *Bcorr*, 50.
[581] Boyle, *Bcorr*, 51. Hunter professes evidence that this letter is dated April 1647, while Birch records in 1772 that "the date . . . is wanting." If Hunter is correct (he concedes the date is conjectural), this is the first correspondence between Boyle and Hartlib, at least that has survived. See also, Birch, *Works I*, xlvi-xlvii.

> *Mercurius Philosophicus*, in an account of the projects and successes of that college, whereof God has made you hitherto the midwife and nurse."[582]

From the outset to the end of this passage, Boyle uses what I would argue are overt allusions to Bacon's work. Perhaps the young Boyle (he would have been twenty) intended to apply to the good graces of Hartlib by invoking, first, Baconian "charity," and second, Bacon's oft-used natal metaphor (even if Bacon himself borrows it from Socrates) to describe Hartlib's dedication to the Office of Address. Hunter points out in his note to the text that "the projects and successes of that college" to which Hartlib is "midwife" and "nurse" is Boyle's reference to his (Hartlib's) Bacon-influenced plan for an Office of Address.[583] Hartlib (with the help of Comenius) was particularly inspired by Bacon's *De augmentis*, and specifically called for that work to be a formal touchstone in the foundation of his project. [584] If Boyle was as familiar with Hartlib's Office of Address as the text of the letter suggests, then surely Boyle had been made intimate both with Bacon's philosophy and with its influence on Hartlib, even at this early stage of their correspondence.

The second letter from Boyle to Hartlib is dated 19 March 1647. Boyle writes this just under two weeks after his letter to Lady Ranelagh regarding the broken furnace.[585] Thomas Birch notes that this is "[t]he first letter I find of Mr. *Boyle* to him [Hartlib]," and this status is reconfirmed in Michael Hunter's 2001 publication of *Correspondence of Robert Boyle 1 1636-61, Introduction.*[586]

This letter is significant for several reasons. First, it contains an early allusion – perhaps Boyle's first – to what will become his signature pursuit: the inquiry into the weight and pressure of air. Boyle demonstrates a particular enthusiasm for this topic. As we recall Boyle's earlier correspondence with Lady Ranelagh a fortnight hence, we are left unsure when and where he might have adopted such a passion for his new pursuit. He writes,

> As for the pneumatical engine, that I use to call a wind-gun, which you mention in your letter as presented to the king, and forbidden by him to have any companions, sure the artist, that received command, was more ingenious than obedient; for I remember very well to have seen one of them not exceeding in bigness, nor differing much in shape

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[582] Boyle, *Bcorr*, 51.
[583] Hunter, in Boyle, *Bcorr*, 51, note "b." Hunter notes that, at this time, "[i]t was common for the 'Office' to be called a 'College'." To Boyle's invocation of "midwife" and "nurse," Bacon commonly uses metaphors rooted in motherhood and midwifery, not least in his allusion to the necessity of "register[ing] . . . the birthes [and] abortions of Time" in "His Preface" of Wats' translation of *De augmentis*. (Bacon, *OAPL*, 9).
[584] See Dury, "Considerations Tending to the Happy Accomplishment of Englands Reformation," 132.
[585] Boyle, *Bcorr*, 52.
[586] Thomas Birch (intervening commentary), in Boyle, *The Works 1*, xxxvii; Boyle, *Bcorr*, xl-xli; 52-53. Hunter concurs that this is the first confirmable correspondence from Boyle to Hartlib.

> from an ordinary carabine, which being charged by the sole impression of the air, would, by violence of the contracted Boreas, send forth a bullet."[587]

This is a riveting passage; it would appear that we are present at the very genesis of what will become Boyle's signature experimental focus.

Later in the letter, we are shown an early juxtaposition of philosophy and practice on Boyle's part. Having expressed his interest in the wind gun, he closes the letter with an expression of intent regarding the works of Johannes Valentinus Andreae (1586-1654), a utopian author himself influenced by Bacon's philosophy:

> Your *Imago Societatis*, and your *Dextera Amoris*, I have great longings to peruse; and though with a deep sense of my insufficiency, I shall very freely express my obedience in delivering the opinion of
>
> Your humble servant, Robert Boyle.[588]

We first find Boyle approaching his study of air pressure, that is, what will become his niche in the dual realm of natural philosophy and experimental practice. Second, by mentioning two works by Johannes Andreae, Boyle exhibits that he is now actively building his own philosophical context of inquiry. Concerning the second point, in the comparison of the two letters, the first to Lady Ranelagh, the second to Hartlib, it becomes apparent to us that Hartlib is the chief patron and advisor to Boyle's project of practice and philosophy at this time. In a sense, Hartlib has guided him from the relatively abstract religious notions of human morality in the divine scheme as Boyle has received it in his life so far into the realm of the practical philosophy that Hartlib has, in large part, received though Bacon's work.

How do we build this association from the short lines of epistolary text cited above? To return to Boyle's closing lines, we discover that Hartlib has bestowed upon his new charge two texts. Both are the work of Andreae. The first, *Imago Societatis*, had been published in 1620 (the same year as Bacon's *Novum organum*; this is only partly a coincidence) with the full title *Christianae Societatis Imago*. The second, *Dextera Amoris*, had been published in 1621 under the full title *Christiani amoris dextera porrecta*. It is extremely significant that Hartlib recommends – or assigns – these to Boyle.

Andreae's work, and the two aforementioned volumes in particular, had served as the intellectual and philosophical foundation of the *Antilia* group. *Antilia* was the name given by Pömer to his proposed utopian project of a "German brotherhood" which had grown out of the university intellectual culture in Rostock.[589] Pömer himself gleaned his inspiration for "the ideal of the fraternal order as remedy to public ills using Andreae's utopian writings" from

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[587] Boyle, *Bcorr*, 53.
[588] Boyle, *Bcorr*, 53.
[589] Dickson, *Tessera of Antilia*, 114-115.

Heinrich Hein (c. 1590-1666), a law professor at the university in Rostock during the 1620s.[590] Here, we recall the early correspondence between Hartlib and Johann Fridwald (in which Fridwald refers to John Dury as "the English preacher"). Hartlib and Fridwald were closely and actively acquainted with Pömer in Rostock and Elbing. In that letter, Fridwald writes of the "causa Antiliana."[591] Hartlib himself would refer to a "Tesseram [or "password"] of Antilia" as late as 1660.[592]

The consistency of intellectual mission demonstrated by Hartlib in passing Andreae's work to the young Boyle in March 1647 serves as testimony to Hartlib's integrity, which, akin to Bacon's own philosophical integrity, did not degrade over time. Hartlib's dedication to the works of Andreae, as to the work of Bacon, remained as strong in 1647 as it had been in the late 1620s. Even more crucially, we find that Hartlib's continued dedication to Andreae's work serves as a revelation to his dedication to Bacon, the founding intellect of the new philosophy.

At the outset of his study of seventeenth-century utopian brotherhoods, Donald R. Dickson assigns to Bacon the credit for having served as the foundation of the entire "movement for utopian Christian reform" in a European continent that had largely remained "in the throes of what has been called the crisis of the seventeenth century."[593] Dickson argues that the utopian movement as a collective whole had been carried out by the "tireless advocates of the reformation of learning Bacon had outlined."[594] Margery Purver argues *a fortiori* that "[i]t is important to notice that Andreae, writing some fifteen years after Bacon had published his *Advancement of Learning* (though before the publication of the *Novum organum* and the *New Atlantis*), reflected the influence which this work had on him; and it is of particular significance that the manifestation of this influence appeared in the same misrepresented notion of a 'pansophic' college as it did with Comenius and Hartlib."[595]

The above considered, we return to the context of correspondence between Boyle and Hartlib and to the specific thesis argument regarding Boyle's pursuit of experimental practice as an exercise of moral utility. Boyle's (confirmable) incipient epistolary dialogue with Hartlib very likely bears witness to the former's entry into the realm of Baconian natural and experimental philosophy. The operative impetus which guides both Boyle and Hartlib is not an enthusiasm for the objective assessment of phenomena, or a reactionary impatience with

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[590] Dickson, *Tessera of Antilia*, 116.
[591] *HP*, 27/34/1A-B, dhi.ac.uk/hartlib/context.
[592] *HP*, 29/8/12A (29/8/10A-16B), dhi.ac.uk/hartlib/context.
[593] Dickson, *Tessera of Antilia*, 1.
[594] Dickson, *Tessera of Antilia*, 1.
[595] Purver, *The Royal Society: Concept and Creation*, 211.

any systemic failures to achieve empirical correctness and exactitude. Instead, both recognise natural inquiry and the acquisition of knowledge to be fit for a far greater, all-inclusive function. Boyle will bring his existing moral dedication to the theatre of natural inquiry and subsequently find his focus in the "pneumatical engine."[596] Boyle, Hartlib, and Dury thus would seem to share the desire to follow what we might call their practical moral directives into their own sub-genres of human advancement. Given Hartlib's and Dury's history of commitment to Bacon's programme, and what we have seen as the robustness of Bacon's influence during the 1640s, we can be certain that Bacon's work would have been the first recommended to Boyle by the former two.

Boyle's natural philosophy, in accordance with Bacon's admonitions, would involve far more than just mechanical, empirical, or merely observational motions. However, the degree to which Boyle may have or may not have been aware of the association between moral husbandry and what we know now as "science" is difficult to ascertain. There has been nothing to suggest that they were separate. In fact, in further response to Shapin's and Schaffer's diminution of the Bacon-Boyle connection, we may note that the self-developed empirical style of Boyle's experimental summaries is itself an evolution of Boyle's own ethics. In "A Proemial Essay," Boyle retroactively reveals that his original intent in experimental practice was to effect "a Continuation of the Lord *Verulam's Sylva sylvarum*, or Natural History […] [a]nd that my intended […] Centuries might resemble his, to which they were to be annex'd."[597] We may thus consider that Boyle's contribution to the foundation of modern science begins in his aspiration to follow Bacon's philosophy as the companion to his own interests, such as the pneumatical engine.

6.4 "Of Desseins & Undertakings"

One of the most illuminating of Boyle's compositions from his pre-1650 period is the short essay "Of Desseins & Undertakings."[598] Michael Hunter's notes for this tract are brief. He merely informs us that "[t]his is a short work from the 1640s. It is in a rather crude hand, which may suggest an earlier date for it than the other items in this section."[599] Hunter's remark regarding the "crude hand" and the "earlier date for" its authorship suggests that the

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[596] Boyle, *Bcorr*, 53.
[597] Boyle, *The Works of Robert Boyle*, *Volume 2* (ed. Hunter and Davis), 17.
[598] Robert Boyle, *Unpublished Writings, 1645-c.1670*, in *The Works of Robert Boyle*, Volume 13, eds. Michael Hunter and Edward B. Davis (London: Pickering & Chatto, 2000), 129.
[599] Michael Hunter, in Robert Boyle, *The Works of Robert Boyle*, *Volume 13*, eds. Michael Hunter and Edward B. Davis (London: Pickering and Chatto, 2000), xxxiii.

piece is one of Boyle's pre-experimental ethical essay exercises written well before his "visible" entrance into the realm of experimental practice.

When we compare it to the initial entries of Boyle's *Workdiaries* begun in 1647 at the time of his first direct association with Hartlib, we indeed see similarities in language and style. Boyle has become more focussed and more sure-footed. We encounter a significant thematic and epistemological departure in his moral philosophy from earlier, more abstract works such as *The Aretology*, a departure which is heralded in the title of the piece.[600] Like most, if not all, of Boyle's writing in his pre-experimental stage in the mid-1640s, he does not explicitly mention Bacon's philosophy. We cannot be exactly sure whether or the degree to which Boyle has made Hartlib's acquaintance, either directly or indirectly, at the time Boyle composed "Of Desseins," as we are unsure of the exact date of its composition. Whatever the case, we note here that Boyle's philosophy, moral and otherwise, seems to have emerged from a context of abstract literary analysis into one of action and of appetite.

"Of Desseins" is not epistolary and therefore is not marked by a quality of diplomatic or ingratiating etiquette. It thus serves well to indicate Boyle's thought processes which emerge from his own private meditations. The reader will note what appear to be allusions to Bacon in these early personal musings which predate Boyle's experimentalism (again, we are unsure if "Of Desseins" predates Boyle's correspondence with Hartlib). As Hartlib had exhibited in the 1620s and 1630s, Boyle reveals a clear desire to attach himself to a practical philosophy, and even exhibits the tendency to defend himself, if rhetorically and abstractly, on behalf of that end. We may thus conclude that Boyle's entrance into experimental practice was guided not by empirical or methodological concerns or curiosities, but by a desire and a growing sense of moral duty to pursue projects that produced useful, decidedly earthly results. "Of Desseins" heralds the first steps in that progression, beginning with the opening line:

> Man is an undertaking Animal: Nature gave him a Head to Conceive Desseins, & a Hand to put them in Execution. Some men ar so Active that they wil do any thing rather than Nothing. Wherefor, since they wil shoot let us propose them a faire Marke. And in Desseins consider the Persons & the Thing: the Undertakers & the Enterprise.[601]

This fanfare seemingly announces Boyle's philosophical entry, as if by epiphany, into the appetitive material world. Boyle now courts the physical – the *animal* – aspects of his humanity as the active means to engage the intellect. Boyle issues a radical claim, particularly for one as religiously devote as himself, when he designates man as an *animal*, and, further,

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[600] Robert Boyle, *The Aretology or Ethicall Elements of Robert Boyle Begun At Stalbridge, The* […] *of 1645. That's the tru Good that makes the owner so,* in Robert Boyle, *The Early Essays and Ethics of Robert Boyle*, ed. John T. Harwood (Carbondale: Southern Illinois University Press, 1991), 3-141.
[601] Boyle, *The Works of Robert Boyle*, *Volume 13*, eds. Hunter and Davis, 129.

one equipped with the potential for ingenuity and undertaking. In *The Aretology*, almost certainly an earlier work, Boyle suggests that the active properties of moral virtue in Man have been instilled by God directly into the will.[602] This necessarily suggests (in opposition to the argument of this thesis) that Boyle, at least in 1645, considers goodness and virtue to be inherent. However, by presenting "man [as] an undertaking animal," he has now placed man at a distance from original divine virtue and, as Bacon has done, put man literally on the ground with the beasts. The notion of Man, the animal, belies Boyle's tacit acknowledgment of the divine punishment of Adam and Eve and so the Fall, which marks the end of man's divine inheritance. Man, Boyle asserts, is now an animal, that is, he is himself a second cause in the scheme of Creation, a co-inhabitant of nature. Where Adam had been endowed, according to his adjutant rank to God, with the task of naming the animals, man the animal must now rebuild his knowledge of God's creation from nothing using his own senses and intellect. Man the animal must be an *undertaking* animal.

Whether Boyle is aware of it or not, it is this type of theological Realpolitik that has inspired the ecclesiastical and educational enterprises of the Hartlib Circle. In "Of Desseins" it appears to manifest in Boyle as both motivation and rationale to engage in the earthly pursuit of natural inquiry: Man the undertaking animal has been given a head to conceive designs. However, what is most striking in the sample of text above is Boyle's identification of *what* has given Man his head for designs; it is *Nature*, not God. Again, whether Boyle realises it or not, he has informed us that, like Bacon before him, he recognises Man's interpretive engagement with nature, his undertaking, to be the duty-bound task of the *fallen.* Man is now a product of Creation, a product of Nature. We are reminded of Bacon's admonition that "one cannot govern nature save by complying with her."[603] Man is now the creator of his own goodness, the husband of his own intellect and moral constitution; he is both "the Undertaker and the Enterprise." The human soul, head, and hand must operate in creative artistic unity. Boyle would seem to have been introduced to Bacon's notion of moral utility.

We notice a particular echo in "Of Desseins," both linguistically and semantically, of a passage in Bacon's *The Advancement of Learning* (1605). Again, we cannot be sure whether Boyle has yet read this at the time of "Of Desseins." In any case, Bacon mounts a multi-pronged rhetorical defence against the various "discredites and disgraces which [learning] hath received."[604] Among his dismissals is "the conceite that Learning should dispose men to

[602] Boyle, *Aretology*, 12.
[603] Bacon, *NO*, 195.
[604] Bacon, *AL*, 5.

leasure and privatenesse, and make men slouthfull."[605] Bacon offers his confidence in man's inherent potential for usefulness:

> [T]hat learning should take vp too much time or leasure, I answere, the most actiue or busie man that hath been or can bee, hath (no question) many vacant times of leasure, while he expecteth the tides and returnes of businesse (except he be either tedious, and of no dispatch, or lightly and vnworthily ambitious, to meddle in thinges that may be better done by others) and then the question is, but how these spaces and times of leasure shall be filled and spent.[606]

Bacon asserts that men, unless they are tedious or unambitious, are endowed with the reasonable potential to be active and useful. It is thus a matter only of the question of how best their "spaces and times of leasure shall be filled and spent" that is, how they may contribute their present lives to meaningful pursuits which might resonate in posterity. He suggests they should be encouraged and educated to that end.

Boyle, as if to confirm Bacon's passage, offers the following: "Men that have much dealing in Bisnes, are apt to undertake; & often fortunately enuf; because Examples furnish them with Ideas […] & Modells of Desseins; & their Experience helps them with multiplic[it]y of ways & meanes to bring it about."[607] Both texts transmit the same message and employ the same argument to support them: active men, or men of business, are predisposed against sloth. Here we see Boyle's approbation of the *vita activa*. We note that, whether Boyle or Bacon are referring to *bisnes* (Boyle) or *businesse* (Bacon) according to its modern semantic of commercial interaction or to its literal meaning of being *busy* with something, the important facet of the term is that both authors apply it as a mode of gaining *experience* from a fount of self-motivation.[608] Boyle, like Bacon, considers men of business to be active men predisposed to ideas, models and designs and so are natural specimens of the "undertaking animal." Bacon pursues this to an even finer end:

> [I]t may bee truley affirmed, that no kinde of men loue businesse for it selfe, but those that are learned . . . [O]nely learned men loue businesse as an action according to nature,

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[605] Bacon, *AL*, 12.
[606] Bacon, *AL*, 13.
[607] Boyle, *The Works of Robert Boyle*, *Volume 13*, eds. Michael Hunter and Edward B. Davis, 129.
[608] While we cannot know for certain exactly how Bacon and Boyle used the term *business*, we can surmise that they did not intend to invoke commercial connotations. The *OED* notes that while *business* as a term which denotes occupation goes back as far as the 15th century, its use to describe commercial affairs is more recent, beginning in the 18th century. For Bacon's and Boyle's purposes, we find the term in the midst of its semantic evolution from general term of occupation to its use to describe commerce. Both Bacon and Boyle are intent that the reader understand that their prescriptions involve devoting one's time and life to useful, rather than trivial, ends. Thus, we may consult *business* definition [II/9/b] in the *OED*: "As a mass noun: action which occupies time and demands attention and effort; *esp*. serious occupation or work, as opposed to pleasure or recreation." The *OED* traces such usage at least back to Chaucer and the late 14th century. Perhaps the most apt literary example of this definition the *OED* offers dates to Thomas More's use of it in his work *Confut. Tyndale* in *Wks.* 826/1: "Occupied in honorable businesse." We note that Bacon uses precisely the same spelling in his use of it. See "business, n.". *OED* Online. March 2022. Oxford University Press. https://www-oed-com.libproxy.york.ac.uk/view/Entry/25229?redirectedFrom=business (accessed April 27, 2022).

> as agreable to health of minde, as exercise is to health of bodie, taking pleasure in the action itself, & not in the purchase: So that of all men, they are the most indefatigable, if it be towards any businesse, which can holde or detaine their minde.[609]

Bacon's "businesse as an action according to nature" is precedent and congruous to Boyle's "Bisnes which provides Modells and Desseins." Both authors invoke man not only as an undertaking animal, but one who is naturally so. Man the animal is endowed with reason and further charged with the duty to husband his intellectual and sensory faculties so that all contribute to the Good of Communion.

We must question whether such exacting lexical and semantic delivery on the part of both authors are coincidental. The young Boyle exhibits a conscious intent to undertake an apprenticeship of useful philosophy in the manner described and prescribed by Bacon. Where Adam had once enjoyed a life with God devoid of conditions (save one, of course) in the Garden of Eden, Man now lives in a world indeed devoid of divine conditions. Boyle would now appear to consider and accept (as Bacon has) that Man is the descendant of Cain who has been given a head for designs, an undertaking animal in the realm of second causes.

6.5 Testimony and *The Christian Virtuoso*

I now direct analysis to Boyle's later, more overtly Baconian writings which mark and define his full stride as the exemplar of the Royal Society and of seventeenth-century natural philosophy at large. In particular, we will see that the semantic intent of "testimony" which Shapin attributes to Boyle in the latter's *The Christian Virtuoso* (1691) aligns more closely to the Baconian semantic field which denotes literate and axiomatic experience and natural history than it does to communitarian epistemological authority as Shapin will suggest. We now turn to that work. Perhaps fittingly, if "Of Desseins" has given us the young Boyle on the verge of undertaking his chosen pursuit of natural philosophy in the 1640s, *The Christian Virtuoso* takes us to the very end of Boyle's life in 1690, when he composed it.

In *A Social History of Truth*, Shapin's analysis of *experience* in natural inquiry cites Boyle's discussion of the same term in *The Christian Virtuoso*. Published in 1690, *The Christian Virtuoso* would be one of Boyle's last writings before his death in 1691. Shapin's intent is to elucidate the particular role of secondary experience – that is, testimony – as the crucial function of epistemological authority. For Shapin, testimony denotes the primary substance of the trust-bonds that sanctify the methodological and epistemological authority of the witness-collective. He rightly points out that "it was widely acknowledged that the

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[609] Bacon, *AL*, 12-13.

category of 'experience' customarily and justifiably encompassed not just what individuals had by way of their own senses but also the reliable testimony they had of others' sensory engagements with the world."[610]

We immediately take note of Shapin's use of the term *testimony* in this passage. First, he supplies no accompanying implication of collective or communitarian authority with his discussion of *testimony*, which we might expect from him. Rather, *testimony* only implies a secondary source of reliable information about the world upon which a student or an inquirer – that is, in the Baconian sense, a *magistral* learner or *initiative* son of science – can build real knowledge.[611] Shapin continues his argument regarding the value of secondary assessments, commenting that "there was nothing necessarily faulty about knowledge which came to one through these routes."[612] He then appropriates Boyle for his defence, asserting that "[he] was one among many commentators who noted that it was through testimony that we come securely and warrantably to have such factual historical knowledge as that Caesar existed and that a new star appeared in the heavens in 1572."[613]

That Shapin includes the information regarding the existence of Caesar and the "new star" of 1572 is highly significant, in the first place, for scholars of the life of Francis Bacon, and in the second place, for the thesis argument which asserts a close philosophical and epistemological bond between Bacon and Robert Boyle.[614] We note that Shapin himself has imported these particular references to Caesar and to what modern historians now call "Tycho's Supernova" directly from *The Christian Virtuoso*. We will revisit both of these references and their origin in Boyle's text below.

We first direct our attention to Shapin's footnote attached to these passages quoted above which cites Boyle's *The Christian Virtuoso*.[615] In the note, Shapin relates that "Boyle then [viz., continuing from Shapin's discussion of the "new star"] distinguished between

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[610] Shapin, *SHoT*, 202-203.
[611] See Bacon, *OAPL*, 272.
[612] Shapin, *SHoT*, 203.
[613] Shapin, *SHoT*, 203.
[614] In his prefatory biography of Bacon entitled "Boyhood," which begins *The Works of Francis Bacon Volume 8: The Letters and The Life, Volume 1* (1862, Facsimile edition, Stuttgart-Bad Canstatt: Friedrich Frommann Verlag Gunther Holzboog, 1962), James Spedding presents the putative story of the young Francis' original impetus to devote himself to the reformation of learning. Spedding writes that, in 1572, "the heavens themselves seemed to be taking up the argument [against Aristotle] on their own behalf, and by suddenly lighting up within the very region of the Unchangeable and Incorruptible, and presently extinguishing, a new fixed star as bright as Jupiter – (the new star in Cassiopeia shone with full lustre on Bacon's freshmanship [at Trinity College, Cambridge] – to be protesting by signs and wonders against the cardinal doctrine of the Aristotelian philosophy. It was then that the thought struck him, the date of which deserves to be recorded, not for anything extraordinary in the thought itself . . . for its influence upon his afterlife. If our study of nature be thus barren, he thought, our method of study must be wrong; might not a better method be found?" (Spedding, *The Works of Francis Bacon, vol. 8*, 3-4).
[615] Shapin, *SHoT*, 203, note 32.

'personal experience, which a man acquires immediately by himself, and accrues to him by his own sensations', and 'historical experience', which, 'though it were personal in some other man, is but by his relation or testimony, whether immediately or mediately, conveyed to us.'"[616]

Shapin draws his analysis from Boyle's deconstruction of experience in *The Christian Virtuoso*. In that work, Boyle subdivides "*Immediate* and *Vicarious* Experience" into "*Personal*, *Historical*, and *Supernatural* (which may be also styl'd *Theological*)" experience.[617] He assigns *Personal experience* an exclusive position under *Immediate experience*, and duly, *Historical* and *Supernatural experience* to a shared classification under *Mediate experience*. Boyle's *Personal experience*, as Shapin has addressed above, refers to that "which a Man acquires immediately by himself, and accrews to him by his own sensations, or the exercise of his Faculties, without the Intervention of any external Testimony."[618] We thus note *Boyle's* use of the term "testimony" as measured against Shapin's above. We recall that in Shapin's analysis, the meaning of testimony includes the implication of communitarian authority and confirms that social trust-bonds and collective consensus determine matters of fact. Again, we find one of Shapin's semantic touchstones to be missing from his own comparative analysis of Boyle's testimony.

Boyle's invocation of an "external Testimony" which is distinct from *Personal experience* warrants closer examination. He does not proceed from "external testimony" to what perhaps Shapin would expect to be a subsidiary discussion involving collective authority or the assenting role of witnesses. Boyle does not even venture to suggest the epistemological essential of peer review. Instead, he steers his reader directly into the second subdivision of *Historical Experience*. "By *Historical Experience*," he explains (this is the passage to which Shapin refers), "I mean that, which tho' it were personal in some Other man, is but by his Relation or Testimony, whether immediately or mediately, conveyed to us."[619] The "Relation or Testimony, whether immediately or mediately conveyed" could be rendered to fit Shapin's conclusions regarding "trust, truthfulness, and social order."[620] Indeed, if interpreted in a communitarian sense, the *relation and testimony* of witnesses implies, at first glance, what

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[616] Shapin, *SHoT*, 203, note 32. Shapin quotes this specific point from *The Christian Virtuoso*, page 57.
[617] Robert Boyle, *The Christian virtuoso shewing that by being addicted to experimental philosophy, a man is rather assisted than indisposed to be a good Christian / by T.H.R.B., fellow of the Royal Society; to which are subjoyn'd, I. a discourse about the distinction that represents some things as above reason, but not contrary to reason, II. The first chapters of a discourse entituled, greatness of mind promoted by Christianity, by the same author* [Reflections upon a theological distinction. Greatness of mind promoted by Christianity. Reflections upon a theological distinction. Greatness of mind promoted by Christianity.], (London, 1690), 55: https://www.proquest.com/books/christian-virtuoso-shewing-that-being-addicted/docview/2240961301/se-2.
[618] Boyle, *Christian Virtuoso*, 55.
[619] Boyle, *Christian Virtuoso*, 55-56.
[620] Shapin, *SHoT*, 10.

might only be identified as social behaviour. The terms *relation* and *testimon*y evoke the image of an express verbal delivery from a witness's mouth to a receiver's ear. However, Boyle's distinction between "immediate" and "mediate" experience only separates a direct personal engagement with a matter of fact (*immediate*) from a credible account of a matter of fact through a trustworthy secondary source (*mediate*). We find nothing in his taxonomy of experience that suggests communitarian authority, or, for that matter, any external authority at all.

Boyle, in fact, contextualises the immediate and mediate sources of *Historical Experience* at a remove from any implication of collective epistemological authority. He contends that "'[t]is by [immediate or mediate testimony] that we know, that there were such Men as *Julius Cæsar*, and *William the Conqueror*, and that *Joseph* knew that *Pharoah* had a Dream, which the Ægyptian wise Men could not expound."[621] We notice here that each of Boyle's examples of testimony are, indeed, historical matters. If we proceed according to Shapin's argument, we would be obligated to accept that the existence of these figures, and the authenticity of the histories in which they have been preserved, can only be confirmed amongst communities who have arrived at a consensus that has accepted, for example, the existence of Caesar as a matter of fact and accepted the validity of the history that describes him. Again, we would be correct to ask on what grounds these communities might base their acceptances or rejections, and whether those acceptances or rejections had yielded the truth.

It is more likely that Boyle endeavoured to draw an epistemological distinction between "immediate experience" as denoted by (Baconian) first-hand sensory-intellectual engagement from "mediate experience" as denoted by a (Baconian) engagement with the literature of experiment, interpretation, and natural history. Boyle seeks to emphasise the epistemological effectiveness of literary works and their authors (*this* is the substance of *mediate* experience) as adjunct to the sensory-intellectual work of the practising inquirer thus engaged with *immediate* experience. Mediate experience in Boyle's case implies the literate or axiomatic experience of past authors and experimenters rather than a source of communitarian authority, especially a communitarian authority situated in the status quo.

In the case of the New Star of 1572 (Tycho's Supernova), Boyle further elaborates on the worthiness of literary history as testimony. He uses that significant event to illuminate all three types of "Immediate" and "Mediate Experience," viz., the *Personal*, the *Historical*, and the *Theological*. While his immediate/Personal experience involves first-hand sensory-intellectual engagement, his subsequent mediate subdivisions of *Historical* and *Theological*

[621] Boyle, *Christian Virtuoso*, 56.

experience are, in fact, *both* historical and literary (for example, what is the Bible to Boyle if not an historical, literary document?). Thus, by mentioning Tycho Brahe, Boyle further grants Baconian epistemological weight to literate and axiomatic experience. In this particular instance, the experience – or testimony – has been provided by the sixteenth-century Danish astronomer (who, as it happens, appealed to no communitarian sources of authority to validate what he deemed to be matters of fact based on his *immediate* sensory-intellectual engagement with the phenomenon). Boyle writes,

> By *Personal Experience*, we know that there are Stars in Heaven; by *Historical* Experience, we know that there was a new Star seen by *Tycho* and other Astronomers, in *Cassiopeia*, in the year 1572. and by *Theological* Experience we know, that the Stars were made on the Fourth Day of the Creation.
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> By this you may see, That I do not in this Discourse take *Experience* in the strictest sense of all, but in a greater latitude, for the knowledge we have of any matter of Fact, which, without owing it to Ratiocination, either we acquire by the Immediate Testimony of our own senses and other Faculties, or accrews to us by the Communicated Testimony of Others.[622]

We see no prescription for a deference to a communitarian authority of consent in Boyle's anatomy of experience. Further, only an unlikely line of interpretation would consider the testimony transmitted to posterity by Tycho and Moses (or whomever actually authored *Genesis*) to have been done so by any but literary means or as a successful applicant to communitarian consent. The original work of any historical examination, whether natural or theological, is most likely not the work of trust-bonded collectives. History itself is the product of individual scholarship (which consults both immediate and mediate sources), the validity of which could only be threatened by the acquiescence to the communitarian expectancies of a *status quo*. In the Baconian sense, the works of Tycho and of Moses (or the author of *Genesis*) are decidedly *Initiative*. That is, they are meant by their authors to be taken up by the future "sons of science" or of Christian theology. They require no communitarian consent. In the case of Moses, we might add that any communitarian authority that rejects his ten famous "axioms" would do so at its own peril. As I have noted in Chapter 3, Moses himself qualifies (as does Tycho) as a model Baconian inquirer, and both qualify as sources of Boyle's useful mediate testimony.

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[622] Boyle, *Christian Virtuoso,* 57. English astronomer Thomas Digges also witnessed the star and recorded his own experience. However, Stephen Pumfrey notes that while "Danish astronomer Tycho Brahe first saw it on 11 November . . . Digges and his contemporaries had no concept of supernovae . . . It attracted the attention, observations, and opinions of countless astronomers and astrologers and natural philosophers, as well as powerful theologians and politicians [and] . . . immediately precipitated a debate throughout Europe about its location, cause, and significance." None of this affected Tycho's assessment in the least. Had it, natural truth would have suffered. See Stephen Pumfrey, "'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, no. 1 (March 2011): 29-31. https://www.jstor.org/stable/41241533.

Boyle's division of Experience into three primary parts is strongly redolent of Bacon's tripartite division of Natural History into the respective Histories of Generations (or the *liberty* of nature), Pretergenerations (or *Monsters*, the *errors* of nature), and Arts (or the human *bonds* of nature).[623] Boyle summons Bacon's famous scheme in what proves to be his (Boyle's) final testament to his own experimental life. In summing up his discussion of experience almost half a century after his own inspired entry to the world of natural histories, he writes,

> In short, the great Architect of Experimental History, Sir *Francis Bacon*, when he divides it but into three parts, assigns the second of them to what he calls *Preter-Generations*; such as Monsters, Prodigies, and other things; which being (as to Us) but Casualties, all those that happen'd in other Times and Places than we have liv'd in, (and those will be confess'd to be incomparably more than any of us has personally observ'd) we must take upon the Credit of others. And yet These, (vicarious Experiments) by Suggesting new Instances of Nature's Power, and uncommon ways of Working; and by Overthrowing, or Limiting received Rules and Traditions, afford us a considerable and instructive part of Natural History, without which, it would not be either so Sound, or so Compleat.[624]

Here, Boyle semantically joins testimony and natural history into a singular *mediate experience*, or the necessary "credit of others." By invoking the "casualties" of the "other things. . . that happen'd in other times and places than we have liv'd in," Boyle would seem to be expressly invoking Bacon regarding the epistemological value of (in Bacon's words) "what in Arts and Sciences *hath been discovered and brought to light in diverse ages, and different Regions of the world . . . and seriously laboured by particular Persons in private*."[625] Boyle even advocates, in true Baconian form, not for communitarian deference, but, instead, for "Overthrowing or Limiting received Rules and Traditions."[626] For both Boyle and Bacon, mediate, historical testimony is no less than an integral part of the means by which knowledge *avoids* becoming a conceit of communitarian expectancies.

Might we then classify Samuel Hartlib as a source of testimony regarding his transmission of Bacon's philosophy to Robert Boyle? Not as such. Hartlib has only recommended Bacon to Boyle and is thus the central actor in the dissemination of Bacon's original (or *immediate*) philosophy. It is Bacon himself who has provided testimony (which, of course, includes his own use of *mediate* experience) and who has enabled the transmission of his work through the written word to Boyle. Boyle, for his part, appears to us as an *Initiative* son of science. Hartlib might more accurately classify as a vehicle of Bacon's

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[623] Bacon, *PAH*, 455.
[624] Boyle, *Christian Virtuoso*, 69-70.
[625] Bacon, *OAPL*, 9.
[626] In *Novum organum*, Bacon recommends "that the botched and (if you like) apish patterns of worlds which men's fancies have thrown together into philosophical systems should be utterly destroyed." (Bacon, *NO*, 187).

literate transmission, perhaps even what Bacon might have seen as a Bensalemite "Merchant of Light."[627]

However, for the sake of argument, even if Hartlib's projects and recommendations could collectively count as testimony, the question remains as to how he might have served a communitarian authority of epistemological consent. Hartlib, in particular, is the epitome of the self-driven, self-actualising individual. He appears to consider it his duty to humanity to collect, promote, and disseminate the works of practitioners who would otherwise languish in obscurity and thus detract from the Good of Communion. We might rightfully speculate the degree to which he has been, himself, moved by Bacon's summons to resurrect and record the "labour [of] particular Persons in private."[628] At the very least, Hartlib recognises and pays tribute to Bacon's emphatic assertion that all knowledge must be communicated and transmitted in order that it be useful and beneficial. We must then, again, qualify Shapin's semantic field of the term "testimony." Testimony in the Baconian-Hartlibian-Boylean case is synonymous with *transmission*, not authority, and certainly not communitarian authority.

6.6 Conclusion: Empericus, Boyle's First "Pupil"

In 1950, Margaret E. Rowbottom's crucial article, "The Earliest Published Writing of Robert Boyle," illuminated Boyle's first literary work intended for formal publication.[629] Though (presumably) written in 1647 and submitted under anonymous authorship (the exact reason for this remains unclear), the tract would not appear until 1655 when Hartlib published it in *Chymical, Medicinal, and Chyrurgical Addresses*. On the extended "Table" (of contents) of the work, Boyle's contribution is listed as "An Epistolic Discourse of Philaretus to Empericus, written by a Person of Singular Piety, Honour, and Learning, inviting all true lovers of Vertue and Mankind, to a free and generous Communication of their Secrets and Receits in Physick."[630] The title alone constitutes a Baconian appeal, though it would be reasonable to surmise that it (the title) had been the work of Hartlib rather than Boyle.

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[627] Francis Bacon, *Philosophical Works, 3*, in *The Works of Francis Bacon*, Volume 3, eds. James Spedding, Robert Leslie Ellis and Douglas Denon Heath (Cambridge: Cambridge University Press, 2011), 164. The Merchants of Light are the first office listed by the Father of Salomon's House in Bacon's *New Atlantis*. The Father of Salomon's House describes them, explaining, "we have twelve that sail into foreign countries, under the names of other nations, (for our own we conceal) who bring us the books, and abstracts, and patterns of experiments of all other parts."

[628] Bacon, *OAPL*, 9.

[629] Margaret E. Rowbottom, "The Earliest Published Writing of Robert Boyle," *Annals of Science* 6, no. 4 (1950): 376-389. https://doi.org/10.1080/00033795000202061.

[630] Samuel Hartlib, *Chymical, medicinal, and chyrurgical addresses made to samuel hartlib, esquire. viz. 1. whether the vrim & thummim were given in the mount, or perfected by art. ... 9. the new postilions, pretended prophetical prognostication, of what shall happen to physitians, chyrurgeons, apothecaries, alchymists, and miners.* (London, 1655), Image 4 (unnumbered page): https://www.proquest.com/books/chymical-medicinal-chyrurgical-addresses-made/docview/2240913639/se-2.

Alternatively, its in-text title matches that on the original draft submitted by Boyle: the relatively prosaic "Philaretus to Empyricus" (Rowbottom notes the discrepancy in the spelling of "Empericus/Empyricus").[631] The title might seem to reference and emulate the passage in Book 1 of *The Advancement of Learning* wherein Bacon designates "the greatest Error of all the rest, [which] is the mistaking or misplacing of the last or furthest end of knowledge" which occurs when "men haue entered into a desire of Learning and knowledge . . . for lukar and profession, and seldome sincerely to giue a true account of their guift of reason, to the benefit and vse of men."[632] As we will see in the examination of the tract, Boyle had motives far more immediate than intellectual curiosity for a "free and generous communication."

"Philaretus to Empyricus" remained unknown until Hartlib's 1655 publication. The first reference to the tract (noted by Rowbottom) appears in a letter addressed by Boyle to Hartlib dated 8 May 1647. Boyle had by this time been in residence at Stalbridge for over two years. However, as we glean from the date of the letter, his epistolary acquaintance with Hartlib was but a matter of weeks afoot. Familiarly addressing Hartlib, Boyle explains that "Philaretus to Empyricus" had been intended as a payment of gratitude "[f]or your bedfellow's receipt for the stone (which certainly wants a parallel, if it be not more easy than effectual)."[633] The bedfellow to whom Boyle refers is Hartlib's wife, Mary (née Burningham) who, like Boyle, suffered from "the stone" and had provided, via her "receipt," what would apparently seem to have been a successful remedy. The stone in this case denotes that particular malady suffered by Boyle, Mary Hartlib, and, in his later years, Samuel Hartlib. In *The Usefulness of Natural Philosophy,* Boyle specifies the condition as "the stone of the bladder, […] whereas it is by most, even of the judicious physicians, unanimously pronounced incurable by physick in what person soever, if it deserve the name of a stone, and be too big to be voided whole, the remedilessness of this disease may be justly questioned."[634] Such a personally urgent aspect of Boyle's interest in the useful interpretation of nature for the good of man must certainly have helped stimulate his pursuits in the realm of experimental philosophy. Accordingly, we must consider that by 1647, Boyle had most likely become familiar, if not intimate, through the agency of Hartlib, with the philosophy of Bacon.

Boyle composed "Philaretus to Empyricus" during 1647, the same year that he began communications with Hartlib, and the same year again that Dury and Hartlib submitted their

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[631] Rowbottom, "The Earliest Published Writing of Robert Boyle," 376-389, 380.
[632] Bacon, *AL*, 31.
[633] In Rowbottom, "The Earliest Published Writing of Robert Boyle," 378; Full text of letter in Robert Boyle, *The Correspondence of Robert Boyle, Volume I, 1636-1661, Introduction*, eds. Michael Hunter, Antonio Clericuzio, and Lawrence M. Principe (London: Pickering and Chatto, 2001), 60.
[634] Robert Boyle, *Robert Boyle: The Works II*, edited by Thomas Birch, (Hildesheim: Georg Olms Verlagsbuchhandlung, 1966 [originally published 1772]), 95.

Considerations Tending to the Happy Accomplishment of England's Reformation to Parliament. *Considerations* contained the aforementioned prescription that precepts of *De augmentis* be implemented through actual political policy on a national scale. Charles Webster attributes to "Philaretus to Empyricus" that it had been "composed very much in the spirit of Hartlib's demand for the completely free distribution of intelligence on all matters."[635] However, as well as omitting the very personal medical issue which serves as the vehicle of Boyle's literary enterprise, Webster makes no mention here of Bacon or Baconian influence.

The text of "Philaretus to Empyricus" itself appears to contain allusions to the precepts of Baconian philosophy regarding the sharing of discoveries. Boyle uses the term and notion of "charity" and its synonymic variants as if to leave no doubt as to the reason for inquisitional activity. Considering the nature of the tract and the spirit with which its author composed and submitted it, I believe Boyle's to be a Baconian rather than a Pauline invocation of *charity*, That Boyle might so frequently employ the word as a means to solicit favour from Hartlib does nothing to dislodge the argument in favour of Baconian influence. While he uses the word according to its more conventional semantic relating to alms, he also takes pains in at least one section to invoke its Baconian meaning as the goal of natural (or, in this case, medical) philosophy. Boyle writes,

> Certainly the almes of curing is a piece of charity, much more extensie than that other of relieving; since only beggars are necessitous of the last: but Princes themselves do often need the former. Why should we think it a greater charity (or more our duty) to give a distressed wretch shelter from the natural cold of the air, than to protect him from the aguish iciness of the blood?[636]

Boyle implies that the requirement of universal human beneficence, whether it be Pauline or Baconian, joins the beggar to the prince and so certainly must join all in between. Perhaps the most significant of the common threads which join all three stages of transmission from Bacon through Hartlib to Boyle is the notion that medicine, as a species both of utility and charity, if it begins as an individual pursuit, must end as a civil, political matter. Within the civil and political frame of medicine, not only, as Boyle suggests, must the needs of the beggar be met, but so must the needs of the prince. Such a unique harmony of society can only happen when medicine is rescued from its incarceration amongst the secretive world of

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[635] Webster, *WGI*, 304.

[636] In Rowbottom, "The Earliest Published Writing of Robert Boyle," 381; See Robert Boyle, *Chymical, Medicinal, and Chyrurgical addresses*, Image 64 (134-135). https://www.proquest.com/books/chymical-medicinal-chyrurgical-addresses-made/docview/2240913639/se-2.

the alchemist physicians or, as Boyle charges in his essay, from "those Usurers, that hoard up all their bags from all those uses, that onely can give riches the Title of a good."[637]

At this point Boyle invokes Bacon's reassuring words regarding the alleged potential of man to acquire a dangerously excessive volume of knowledge, that there can (as Bacon asserts) "be no fulnesse, [and so] then is the Continent greater, than the Content."[638] To allay the "Miser's" fear of having his stocks depleted should he share his beneficial secrets, Boyle appeals that,

> receipts, like Torches, that in the lighting of others, do not wast themselves, may be imparted without the least diminution. Certainly if (as a wise man allegorically said) he is as much guilty of the extinction of a lamp, that denieth it necessary oyle, as he that actually bloweth it out.[639]

Boyle invokes the image of the "lamp," which is the object of Bacon's signature metaphor of the transmission of knowledge. The imagery of the lamp, and of light, appear *passim* in Bacon's work. In *The Advancement of Learning* (1605), Bacon early on issues his fanfaric assertion "that nothing parcell of the world is denied to Mans enquirie and invention: hee doth in another place rule ouer; when hee sayeth, *The Spirit of Man is as the Lampe of God, wherewith hee searcheth the inwardness of all secrets.*"[640] We recall his explicit definition twenty-three years later in the Sixth Book of *De augmentis*. Bacon "number[s] […] amongst DEFICIENTS [what he] call[s] […] *Traditionem Lampadis, the Delivery of the Lampe, or the Method bequeathed to the sonnes of Sapience.*"[641] Thus, the "wise man" to whom Boyle refers is very likely Bacon.

And so, in this chapter, we have covered the full breadth of Robert Boyle's adult life. If we catch but glimpses of Bacon in the early days of Boyle's writings, we later see him as one of the primary occupants of Boyle's pantheon of respected philosophers. While authors such as Shapin and Schaffer prefer to examine Boyle the gentleman practitioner, we nonetheless find that the core of Boyle's natural philosophy was governed by a moral compass and, moreover, a moral appetite. Boyle may have been a Baconian inquirer before he was fully aware that he was.

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[637] Rowbottom, "The Earliest Published Writing of Robert Boyle," 381.
[638] Bacon, *AL*, 6.
[639] Rowbottom, "The Earliest Published Writing of Robert Boyle," 381.
[640] Bacon, *AL*, 7.
[641] Bacon, *OAPL*, 273.

Chapter 7: Conclusion

7.1 A Synopsis of Baconian Goodness

For Bacon, the presence and power of *goodness* in the human individual is self-constructed and self-invested. The scope of its jurisdiction is comprehensive; it governs (or attempts to govern, if invited) not only the mind, but the body, as well. The moral virtues represent the *forms* of goodness which extend from that primary material. In Bacon's scheme, the individual, in effect, *decides* to make their reason, *right reason*. "This," as Bacon informs at the very outset of the thesis, "indeed is an operation, which resembleth the *work of nature*."[642] Right reason, made "right" by the appetitive power of goodness, is inherent in nature but is an artificial construct in the human animal. Postlapsarian Man no longer exists, as did Adam, in the cohort of divinity, but as a denizen of second causes now required to manufacture his own usefulness. For Bacon, usefulness and goodness are conterminous. Nature need not take care to make itself useful.

Both the natural and artificial forms of goodness are comprised of the same appetite and serve the same purpose in their respective realms: to ensure a progress to posterity and to the good of the whole.[643] Bacon names this goal as it pertains to the human world the Good of Communion. I have endeavoured to show that the Good of Communion can only be realised subsequently to the initial respective successes of individuals to construct and cultivate their own reserves of Self-Good. This cultivation constitutes a Cupidic act: as with Cupid's building of primary matter from the "uncreated mass" of Chaos, the motive construction of the human material of goodness begets the material itself. For Bacon, matter is defined by its appetitive motion.[644] Thus, goodness is as goodness does, and the same is true for the resulting forms of the moral virtues. Bacon writes,

> *Moral Knowledge,* may be set downe, which is, *that there is a kind of relation and Conformity between the Good of the mind, and the Good of the Body.* For as the *Good of the Body* consists . . . of *Health*, *Beauty*, *Strength*, and *Pleasure*; So the *Good of the Mind*, if we consider it according to the Axioms and Precepts of *Morale Knowledge*, we shall perceive to this point, *to make the mind sound, and discharg'd from Perturbation*; *Beautifull and graced with the ornaments of true Decency*; *strong to all duties of life*; *Lastly not stupid, but retaining an active and lively sense of Pleasure and honest Recreation*.[645]

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[642] Bacon, *OAPL*, 360.
[643] We recall Weeks' "Art-Nature Distinction," *passim*.
[644] Bacon, *DPAO*, 199
[645] Bacon, *OAPL*, 363.

Bacon implies that human beings must, on behalf of the Good of Communion, consciously commit themselves to an artificial construction of the same forces that exist inherently in nature. "Health," "Beauty," and "Decency," for example, are not inherent qualities in the human animal, nor are they divinely instilled. We note that both classes of goodness above – that of mind and body – are equipped with the implication not only of deliberate cultivation, but the cultivation of controllable elements. Again, only reason is inherent in Man; the man must *make* it right. It is that right reason that Bacon insists can and must govern the human animal.

This administration is especially crucial to natural inquiry and to the interpretation of nature, As such, Bacon's endeavour to provide the philosophical, methodological, and epistemological "foundation […] in the human intellect for a true pattern of the world as we actually find it and not as someone's own private reason hands it down to him" does not seek to bind the human psychology and physiology to a tyrannical empirical method.[646] His admonition regarding the assessment of things as they actually are also carries his caveat that the sense and intellect of even the most disciplined inquirer are inherently subject to error and misjudgement. The natural inquirer is to treat his occupation first as an exercise of moral and spiritual discipline. As they are relative to the conditions of mind and body Bacon describes above, the means must be the end. For the natural inquirer, the object of moral discipline is to facilitate the transmission of useful knowledge to posterity in the form of either literate experience or axioms that are the product of natural interpretation. In Bacon's view, the entirety of the experimental experience is useful – that is, appetitively *good* – including the errors. While usefulness in Bacon's philosophy is defined and proved by human beneficence and its apotheosis of charity, the natural inquirer does not himself have power to determine what will be beneficial and charitable; that power belongs to time alone. The inquirer can only give himself to the good and moral integrity of his marriage-song with nature.[647]

The statement of purpose with which Bacon opens *Novum organum* (1620) reveals the true scope of his motive for undertaking the reform of natural philosophy and learning. Placing himself in the third person, he writes,

> *Since he knew for a fact that the human intellect was the author of its own difficulties by not applying calmly and opportunely the right remedies which lie within man's power – whence comes manifold ignorance of things and from that ignorance countless disadvantages – he thought that every effort should be directed to seeing how the commerce between the* Mind *and* Things (*to which scarcely anything on Earth or, at*

[646] Bacon, *NO*, 187.
[647] Bacon, *OAPL*, 30.

> *any rate, earthly things can compare*) could be entirely restored, or at least put on a better footing.[648]

In this passage, Bacon's invocation of a "commerce of Mind and Things" describes what should occur at the operative core of natural philosophy. He does not use the ontological implication of the terms "Mind" or "Things" abstractly. In Bacon's scheme, individual goodness serves as the foundation of sensory-intellectual "commerce" between human and nature. The mind holds both the intellect and the moral virtues, the latter of which the individual cultivates as a measure of self-discipline from the (artificial) primary, appetitive material of their own goodness. Moral virtues represent the further (again) artificial subsidiary passions of goodness. They are thus the end products of a process which begins when the unclaimed reason inherent in the human will is distilled by the individual into the primary material of goodness. The piecemeal moral virtues themselves are collectively defined by Bacon as "*the last and highest pitch* […] *mans Nature of it selfe hath ever reach't in all the Perfections both of Body and Mind*."[649] Behavioural disciplines such as bravery and fortitude, especially in the face of one's own imminent demise, represent not only admirable human qualities, but further, the successful cultivation of the individual's appetitive goodness.

Bacon's intent in his invocation of "private reason" as it appears in the quote above is not to levy censure against an individual inquiry into nature that fails to consider itself beholden to a collective, communitarian authority. For Bacon, the individual inquirer's sensory-intellectual observations, interpretations, and conclusions are, in fact, the only tools which are capable of discovering natural truths. He places natural inquiry and the advancement of learning at large within the remand of a morally sound and disciplined individual human instrument. Bacon contends that "*Right Reason governs the will, Good Apparent seduceth it*."[650] The seduction of "Good Apparent" is the first appetitive action of individual human "goodness," which is tantamount to the appetitive primary matter of the human psyche. The cultivation of individual goodness is a solitary, all but ascetic endeavour of self-discipline. The "Individual or Self-good," as Bacon designates it, provides the foundation in the mind for the individual moral virtue under which the sensory-intellectual endeavour of natural inquiry should be carried out by the practitioner.[651]

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[648] Bacon, *NO*, 3.
[649] Bacon, *OAPL*, 179-180. Bacon further lists examples of such behaviour in *OAPL*, 179-181. At this point early in Book 4, he calls for a companion to the Natural Histories in the form of "a Collection . . . made of the Ultimities . . . or Summities . . . of Human Nature . . . out of the faithfull reports of History." He includes such anecdotal material as Sir Thomas More's wry reply to the barber who has come to cut his hair the day before his execution.
[650] Bacon, *OAPL*, 333.
[651] For the *Self-good* and *Good of Communion*, see Bacon, *OAPL*, 337 ff.

The metaphorical marriage of the natural inquirer to their subject of nature – of mind to universe – extends from the original husbandry of individual goodness and the cultivation of the moral virtues.[652] We have seen this above in the discussions of Samuel Hartlib, John Dury, and Robert Boyle, who, in their respective and contemporaneous projects, proceeded from sources marked by the Baconian proviso that the good of Man must be the highest goal of any endeavour that aspires to be meaningful. In the case of Hartlib and Dury, Bacon's language to this effect is present in both their correspondence and literary works in the late 1620s, the period which marks the outset of the combined and individual pursuits for which they would become known to historians. The same is true for Robert Boyle, whose initial correspondence with Samuel Hartlib in the mid-1640s bristles with invocations of charity, the very basis for Baconian natural inquiry. In one of his first letters to Hartlib, dated "early 1647" (the very first line of which, indeed, mentions "charity"), Boyle writes,

> I shall in my following epistles (if this procure them a pass) take the liberty to acquaint you with what thoughts and observations of mine I shall judge useful in reference to so glorious a design; to which I shall think it very much my happiness, if any endeavours of mine can have the honour in the least measure to contribute, not only as they owe a duty to the public (though, I must confess, that of itself a very prevalent motive) but because I know you so vastly affectionate to that public, that my invention will furnish me with no fitter way, than that of my services to it, to give you real and accepted testimonies of my being, &c.[653]

As it had been with Bacon, so it would be with Hartlib, Dury, and Boyle. The practitioner's contribution to the beneficence of Mankind, that is, the morally-informed acquisition and exercise of knowledge on behalf of utility, posterity, and charity, begins with the dedicated individual, not the community. This is the case no matter what disciplinary sector the practitioner's work may inhabit: scientific, ecumenical, pedagogical, or otherwise. What Bacon designates the Individual or Self-good is the precedent to the Good of Communion, even as the latter remains a superior appetite to the former. [654] Without the full and proper cultivation of the Self-Good, the Good of Communion cannot be realised. The role of the collective is to ensure the proper transmission and dissemination of that knowledge; such community involvement with natural inquiry occurs at a much later stage of the experimental process.

Bacon seeks to harness the best qualities in the human interpretive instrument as a means to rescue the interpretation of nature from the errant conceits that have obstructed its full potential. At the very core of his reform is his placement of the human being as

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[652] Bacon, *OAPL*, 30.
[653] Boyle, *Bcorr*, 51. I discuss this letter in Chapter 6.
[654] See Bacon, *OAPL*, 337 ff.

participant in a scheme of existence that is divided between the substance of Natural History and that of Civil History.[655] Man is at once an inhabitant of the natural world and of the civil world. However, in order to gain true knowledge of the former, he must remove himself from the milieu of the civil theatre where the Idols of the mind receive reinforcement and make true induction impossible. Therefore, while Bacon's natural philosophy has been credited by modern historians with inaugurating the methodological format of collaborative and cooperative science, his first concern in the reform of natural inquiry is the moral, intellectual, and sensory integrity of the individual natural inquirer.

Bacon contends that there can be no useful natural philosophy or advancement of learning without an engaged relationship with nature on the part of the natural inquirer. The inquirer's labours must, according to Bacon, be motivated and mediated by the goodness and moral virtues of that individual. The artificial appetitive good in man approximates the inherent appetitive good in nature; in both cases, goodness manifests as the appetitive fidelity to posterity. It thus stands that man, as the experimenting inquisitor of nature, must rid himself of the *status quo* distractions born of communitarian concerns and traditions, and above all, to the conceit of collective consensus as methodological and epistemological authority.

Bacon's sensory-intellectual natural inquiry into nature must be, at first, an individual ascetic undertaking. I have thus sought to qualify the historiographical claim that trust and testimony amongst social peers are the authoritative source of experimental validation. These factors become crucial only much later in the progress of Bacon's epistemology. Instead, Bacon insists that the complete record of inquiry, including the errors and doubts that appear in the self-assessment of the solitary inquirer, be entered into the literate experience and axiomatic interpretation of experiment, and, ultimately, the greater natural histories.[656] The errors of experiment, Bacon asserts, like the truth of axioms, cannot help but be either confirmed or dismissed in the passage of time. Untruths only survive as truth in the present and are kept alive by the expectations of communitarian beliefs, not corrected by them. However, if the experience of inquiry is faithfully noted in due course by the self-disciplined experimenter, that experience will be proven or disproven in the due course of the transmission of knowledge. This can only happen if, one, the full and true experience of the practitioner is recorded (thus, the necessity that the practitioner cultivate their primary material of individual goodness and harness their passions to the end of moral virtue) and,

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[655] See Bacon, *OAPL*, 79 ff.

[656] These histories account for Bacon's Natural, Preternatural, and Artistic discourses of Natural History, what Bacon calls the "triple condition" of Nature. See Bacon, *PAH*, 455 (and *passim* throughout his works).

two, if that experience is kept at a remove from the forces which seek to appropriate scientific evidence – i.e., natural truths – to the end of confirming the conceits and beliefs of the community.

7.2 Individual Goodness, Moral Virtue, and the Active Life: A Brief Return to Aristotle

Bacon's philosophy requires that both goodness and moral virtue surpass the limits placed upon them by Aristotle as described in the latter's *Nicomachean Ethics*. Bacon at first agrees with Aristotle that individual virtues are *not* inherent in the human being, that they are, instead states of mind and matters of character which are the products of conscious cultivation. Aristotle notes that "in speaking about a man's character we do not say that he is wise or had understanding but that he is good-tempered or temperate; yet we praise the wise man also with respect to his state of mind; and of states of mind we call those which merit praise virtues."[657] However, Bacon rejects the accompanying rationale of the *contemplative* (read, *inactive*) life wherein, as Aristotle asserts, "happiness . . . [is] in accordance with virtue, [and so] in accordance with the highest virtue; and [that it is] the best thing in us."[658] As we have seen above, Bacon asserts that *charity*, not happiness, is the highest virtue, that the former carries with it the fundamental implied meaning of useful works. For Bacon, individual goodness and moral virtue comprise the active material foundation of *utility*.

We can pinpoint Bacon's departure from Aristotle in the words of the latter:

> The philosopher, even when by himself, can contemplate truth, and the better the wiser he is; he can perhaps do so better if he has fellow workers, but still he is the most self-sufficient. And this activity alone would seem to be loved for its own sake for nothing arises from it apart from the contemplating, while from practical activities we gain more or less apart from the action."[659]

Bacon agrees with Aristotle on the importance of "self-sufficient" philosophy, but seeks to place that self-sufficient philosophy in "the world as we actually find it."[660] "Practical activities" must extend from "self-sufficient" contemplations. Bacon might amend Aristotle by advising that the *natural inquirer*, (even when) by himself, *must actively seek natural* truths. Bacon does not separate the virtuous from the practical in the self-sufficient individual. Charity is the highest virtue of all in Bacon's view precisely *because* of its implication of practical yield and its direct relationship with self-disciplined natural inquiry. For his part,

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[657] Aristotle, *Ethica Nicomachea*. Book I, Section 13, 1103a, lines 5 –10.
[658] Aristotle, *Ethica Nicomachea*. Book X, Section 7, 1177a, lines 10 – 15.
[659] Aristotle, *Ethica Nicomachea*. Book X, Section 7, 1177a-1177b, line 30 (1177a)-line 5 (1177b).
[660] Bacon, *NO*, 187.

Aristotle assigns "the activity of the practical virtues [to] political or military affairs," the "actions" of which are "unleisurely."[661] Bacon abhors this.

Bacon seeks to reify Aristotle's static "happiness" into the practical – and practicable – world of useful natural truths and charity. He charges that Aristotle's self-sufficient contemplative life which aspires to happiness serves only the self and wants no greater purpose. Conversely, Bacon's individual moral virtues, cultivated out of individual goodness, are to be engaged in the world as practical action. The Self-Good thus represents the initial appetitive motion of the individual beyond the remit of their own happiness toward the Good of Communion, of which charity is the apotheosis. Bacon thus contradicts Aristotle:

> Many of the elect Saints of God have rather wished themselves anathematiz'd and raz'd out of the *Book of Life* than that their brethren should not attain salvation; provoked through an extasie of Charitie and infinite feeling of the *Good of Communion* . . . [This] decideth the Question *touching the preferment of the Contemplative or Active life;* and that against the opinion of *Aristotle:* for all the reasons which he brings for the *Contemplative*, respect a *private Good*, and the pleasure and dignitie of an Individual only; in which respects (no question) a *Contemplative life* hath the preheminence."[662]

For Bacon, the knowledge that enables the beneficence of humanity depends first upon the morally self-disciplined individual. Thus, the paradox that, in the sensory-intellectual initial stages of natural inquiry, the individual inquirer must remove themselves from the pressures of communitarian expectancies which only compromise the epistemological route to charity. While Aristotle defines practical virtue in terms of what Bacon would designate the civil sphere, Bacon assigns a duty of practical moral virtue to the Self-good, as well.

Thus, in Bacon's epistemological and methodological scheme, the goodness in man supports the proper functions of both the sense and the intellect. The appetitive goodness in individual human beings is analogous to the appetitive goodness in nature, the former a conscious and dedicated work of art, the latter, inherent. Nonetheless, Bacon considers both to possess the material quality of appetite and thus to contribute analogously to the preservation and perpetuation of their respective wholes. In the human world, the preservation of the whole proceeds under the jurisdiction of charity, which implies posterity. Individual human beings, especially those who would undertake natural inquiry, must contribute their respective efforts to ends that their own mortality will prevent them from seeing themselves. Moral virtue provides the conditions under which such a contribution can be "blindly" made by the practitioner of natural philosophy to posterity without becoming consumed by the pressures of the *status quo*, of which their own mortality is a part. Individuals can only ensure that this

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[661] Aristotle, *Ethica Nicomachea*, Book X, Section 7, 1177b, lines 5-s10,
[662] Bacon, *OAPL*, 338.

task is productive and beneficial to humanity through a strict self-discipline in the cultivation of their own appetitive goodness.

Charity, which Bacon designates "[*t*]*he bond of perfection*; because it comprehends and fastens all virtues together," serves as the proof and product of useful knowledge.[663] It is the objective of the acquisition of knowledge, especially the knowledge of Nature as it is gained by dedicated inquirers. However, Baconian charity paradoxically transcends even what he designates as its substantive source in the Christian faith (I do not propose that Bacon is, himself, non-religious, much less anti-religious). Bacon prescribes that charity be applied to the aegis of human utility, that is, to a human perfection, which, at its end, represents itself in the attempt to imitate and work with nature rather than solicit or aspire to an unattainable divinity. As we recall Bacon's materialism in the form of Cupid, or Love, "the atom," we read "[*t*]*hat all other affections thoe they raise the Mind, yet they distort and disorder it by their extasies and excesses; but only love doth at the same instant, dilate and compose the mind.* So all other humane excellencies, which we admire; thoe they advance nature, yet they are subject to *excesse*; only *Charity* admits no excesse."[664]

> John C. Briggs summarises,
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> Bacon's guiding star for the new learning is charity, a 'duty' toward the world rather than toward the 'private and particular'. The laws of nature and Christianity establish that this good is 'engraven upon man'. It ought to be, 'if he degenerate not, . . . more precious than the conservation of life and being'. The law of charity appears to settle 'most of the controversies wherein Moral Philosophy is conversant', particularly 'the preferment of the contemplative or active life', which it seems to decide against contemplation. Champions of the new learning must act in order to escape exclusive concern for themselves . . . But how will charitable action prevent idolatrous abuse of knowledge?[665]

In Briggs' assessment, it is nature and Christianity that are the primary instruments by which good(ness) is engraven upon man. This is a slight amendment of Bacon's view, which holds that "double nature of good" is demarcated by that good which is "as every thing . . . is a total or substantive in itself [and] the other, as it is a part or member of a greater body."[666] These, again, are what Bacon has designated Self-Good and the Good of Communion. We might argue that paradoxically (if not controversially), it is within and due to that that material duality that Man is able to demonstrate his religious faith. Continuing with Briggs' point, we understand that it is by the *laws* of both nature and/or Christianity that goodness is "engraven

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[663] Bacon, *OAPL*, 361.
[664] Bacon, *OAPL*, 361-362.
[665] John C. Briggs, *Francis Bacon and the Rhetoric of Nature* (Cambridge: Harvard University Press, 1989), 7.
[666] Francis Bacon, *The Works of Francis Bacon Volume 3: Philosophical Works 3*. Eds. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath (Cambridge: Cambridge University Press, 1857), 420. For Self-Good and the Good of Communion, see *OAPL*, 337ff.

upon man." However, what has, in reality, been engraved according to those laws is man's *potential* for goodness (Adam was the first and last human being to be inherently possessed of goodness). That potential, if left untried, provides no prevention against the "idolatrous abuse of knowledge." This potential can only become fructified as goodness pending its voluntary acceptance and further cultivation on the part of the human individual. Man can decide to be degenerate or to be evil, can decide to refract the reason of his will through a lens other than goodness. Like the other virtues, charity (which is the highest virtue) is as charity does. However, where Aristotle associates the moral virtues with the *vita contemplativa*, Bacon assigns them a place at the working core of the *vita activa*, without which, as in the case of reason, the *vita activa* is susceptible to any range of *seducing* influences. Briggs continues, explaining the crucial and somewhat delicate nuance of Baconian charity:

> In the deeper course of his argument, Bacon is really talking about 'good intentions' and 'good conscience', not actions as such. *Charity is essentially the endurance of temptation and indignity* . . . it is a willingness to sacrifice, rather than a consistent practice of generosity. 'Active Good' may in fact be remote from charity and be prompted by the private pursuit of security, of variety that relieves Saturnine despair, and of procreation for the sake of pleasure and illusion of longevity.[667]

We note Briggs' invocation of an active good that, extending from the unclaimed reason of the will, is susceptible to misuse. The *active life* must, in Bacon's view, be harnessed and deliberately directed toward an appetitive goodness that corresponds to that in Nature, a goodness that has no need of private security and certainly no need for procreation on behalf of pleasure or illusions of any kind.

Bacon's rejection of Aristotle's useless *vita contemplativa* aside, the former further chastises the latter for allowing only that the individual may exercise power over his passions, affections, and virtues. Bacon gives *ultimate* power to artificial goodness and moral virtue, which exercises jurisdiction even in the divine franchise of the human will. He writes, "That opinion of *Aristotle* seemeth to me to favour of negligence and a narrow Contemplation, where he asserts […] *that those Actions which are natural can not be changed by custome*."[668] It is Man, not God or even nature, who seduces his reason with goodness.

In the particular case of the natural inquirer, the path to charity begins in the sacrosanct "bride-chamber of Mind and Universe," a self-disciplined construct made and inhabited by the individual natural inquirer at the outset of their endeavours.[669] It is within this private chamber that inquirers, seekers of knowledge, devote themselves to a progress toward

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[667] Briggs, *Francis Bacon and the Rhetoric of Nature*, 7. Emphasis mine.
[668] Bacon, *OAPL*, 356.
[669] Bacon, *OAPL*, 30.

the sensory-intellectual induction of axioms. The useful knowledge which becomes the substance of charity, that is, what becomes useful for the human collective whole, is built on these individually constructed axioms. It is not built on the collective, Idolic expectancies of communitarian authority.

For Bacon, the inquiry into nature is a virtuous pursuit, one built from the primary appetitive material of individual goodness in men. I have analysed the goodness that each individual must cultivate from the unclaimed reason of the will as a human appetitive deference to posterity which corresponds to its analogue in Nature. This wilful self-disciplinary act implies a fundamental sacrifice on the part of the natural inquirer who, through his efforts to produce useful knowledge, surrenders his own present to the future of humanity. His dedication to the integrity of his experiments serves as his acknowledgement of his own mortality. The visible evidence that he has accepted this reality is shown in his moral virtues. If charity is "*the bond of perfection*," then the moral virtues, the active forms built of the primary material of individual goodness, represent "*the last and highest pitch, to which mans Nature of it selfe hath ever reached*."[670] The work of the inquirer's sacrifice on behalf of posterity and charity begins in the respective "bride-chambers" which each individual enters precedent to their respective labours.[671] Bacon's philosophy is imbued with the imperative that the pursuit of natural inquiry proceed from this matrimonial foundation. In the material and utilitarian realm of his epistemological scheme, knowledge is not an end unto itself. It is a living organism, a matter of mind and things, that is rooted in the joined materials of human goodness and natural truth.

[670] Bacon, *OAPL*, 180.
[671] Bacon, *OAPL*, 30.

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