



PROJECT MUSE®

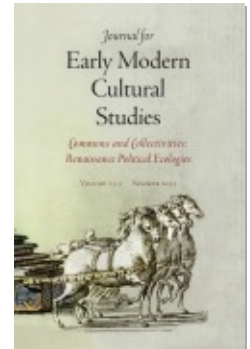
---

## Francis Bacon's Common Notion

Henry S. Turner

Journal for Early Modern Cultural Studies, Volume 13, Number 3, Summer 2013, pp. 7-32 (Article)

Published by University of Pennsylvania Press  
DOI: 10.1353/jem.2013.0023



➔ For additional information about this article

<http://muse.jhu.edu/journals/jem/summary/v013/13.3.turner.html>

# Francis Bacon's Common Notion

HENRY S. TURNER

## ABSTRACT

*This essay examines the political imaginary of Bacon's philosophy of nature as elaborated in the Novum Organum (1620). It concentrates on the formation of notions in Bacon's method and on the structure of the notion as a political form, as well as on the formation of axioms, form, and laws as important components of the "political biology" that Bacon describes. The essay traces how the idea of the "common" drives Bacon's account of natural and political bodies; it argues that his notion of the "common" is in tension with his notion of the "collective," and it suggests some of the ways in which Bacon's work can shed light on theories of politics based on a principle of sovereignty. It concludes by sketching the outlines of a "compositional" theory of political bodies in Bacon's work.*



To what extent can scientific method and the history of scientific thought shed light on the formation of political concepts? On their definition and the difficulties associated with arriving at these definitions? These questions are central to Francis Bacon's entire *corpus*, with continued relevance for today's political theory, especially in its ecological, assemblaged, and other posthuman varieties.<sup>1</sup> For Bacon's philosophy of Nature depends on principles that derive directly from the political thought of his moment in ways that are fairly obvious, although this same claim can be stated somewhat more subtly, or in a more "genealogical" way, by saying that Bacon's account of Nature and of his reformed method tends to decompose, to re-organize, and to redefine several components of philosophical thought in general that are coming to have an important "political" dimension in his period. That is, his work can be said to refract existing political ideas in order to reveal their internal composition, but it also "politicizes" (as in "polarize" or "catalyze") broader philosophical ideas by

endowing them with a new application or new set of meanings. Approached in this way, Bacon's method reveals to us less a prior existing domain of "political thought" than the conceptual ingredients that are necessary to that domain and that Bacon also finds operating in natural bodies.<sup>2</sup> These ingredients include:

1. the more general relationship between parts and wholes, plurality and unity, and the problems of scale and ontology these imply;
2. the definition of a "body" as a provisional unity formed out of collected particulars, and thus also the nature of its internal organization;
3. the nature of "collecting" as a philosophical activity, one that is simultaneously mental and physical, intellectual and manipulative, speculative and operational;
4. the nature of action and force as formal principles that determine the characteristic of natural and political bodies alike, and thus also the nature of "formal" ideas in Bacon's method, a famous and explicit problem for him.

All four problems structure Bacon's account of authentic philosophical knowledge as well as the way he seems to regard "political" ideas. Looking closely at Bacon's method thus sheds considerable light not only on how his natural philosophy implies a political philosophy, and vice versa, but also on the prior problem of defining philosophy itself—a meta-philosophical concern, as it were, that runs throughout all of Bacon's work. His "Instauration" can be described quite simply as one of the first and richest inquiries into the identities of philosophy, science, politics, theology, history, and fiction as distinct domains of human thought, and the ways in which they interact with one another around a set of shared ideas and problems. Since *this* argument remains far too large to demonstrate in a single essay, I will be concentrating on relationships between the first three domains, as these are articulated in Bacon's *Novum Organum* (1620).<sup>3</sup>

In light of the theme of this journal's special issue, I propose to look closely at the way Bacon treats the problems of "commonness" and of "collectivity": my guiding question will be whether these ideas are complementary to one another or whether they are in tension, and my hypothesis is that "commons" and "collectivities" do *not* go together as we might expect. The Italian political philosopher Roberto Esposito has sharply posed a version of the problem: should "community" and "commonality" be understood as a question of *shared*

qualities, i.e., of participation, coincidence, agreement, and the possession of an array of attributes, positively defined? Or is “*communitas*” and “commonality” the result of an alienating gesture: a giving away of the proper, a donation of self that renders the “common” only as the effect of a subtraction, a seam, or a scar? The particular form of “commonality” I will be focusing on is Bacon’s idea of a “notion” in general and how it is made—we would say *concept*, but Bacon himself does not use the term, which the *Oxford English Dictionary* helpfully dates for us only as of the middle of the seventeenth century. A primary aim of what follows will be to show that the process of defining notions in general and the process of defining specifically “political” notions (or notions *about* politics) are formally equivalent in Bacon’s method, i.e., that the notion has the structure of a “political” entity even before we consider it within a taxonomy of ideas about specific political types. Following closely how Bacon accounts for the formation of “notions” will then lead us to some unexpected insights about the political forms that reside in Bacon’s philosophy of nature. For in Bacon’s work, as in Aristotle’s before him, natural bodies provide conceptual templates for thinking about political bodies; in this sense, Bacon offers us not a “political theology” but a “political biology,” with implications for our own current theories about biopolitics and about sovereignty.

### Collecting the Notion

The title for my essay has been taken from a passage in the *Novum Organum* that seemed straightforward to me when I first encountered it but that I have since come to feel requires some extra explanation, a feeling that began when I tried to translate Bacon’s Latin into English. I will come to the passage in question in a moment; first, it will be important to remind the reader about some aspects of Bacon’s method and his larger project to reform “philosophy.” As many readers will remember, one of the most important elements of Bacon’s critique of received philosophies is that they rely too much upon naïve experience, too much upon unsystematic inquiry, too much upon the syllogism (the signature of both Aristotelian and scholastic logic), and therefore on their hastily derived result: what Bacon sometimes calls “primary notions,” sometimes “vulgar notions,” and sometimes “common notions.” As Bacon puts it in the introductory matter to the *Novum Organum*:

the primary notions of things [*Notiones Rerum Primae*] which the mind readily and passively imbibes, stores up, and accumulates (and it is from

them that all the rest flow) are false, confused, and overhastily abstracted from the facts; nor are the secondary and subsequent notions less arbitrary and inconstant; whence it follows that the entire fabric of human reason which we employ in the inquisition of nature is badly put together and built up, and like some magnificent structure without any foundation. (3)

His *New Organon* is a new logic, one that:

aims to teach and instruct the understanding, not that it may with the slender tendrils of the mind snatch at and lay hold of abstract notions (as the common logic does), but that it may in the very truth dissect nature, and discover the virtues and actions of bodies [*Corporum virtutes & Actus*], with their laws as determined in matter; so that this science flows not merely from the nature of the mind, but also from the nature of things . . . (2.52)

Left to its own devices, the human mind (*anima*) or understanding (*intellectus*) is prey to conjecture, imagination, or stubborn fixation on one or two pieces of hard-won evidence. Bacon constantly warns us away from these pseudo-philosophies, which we could call, for convenience's sake, "scholastic." They proceed without method and from a primary philosophical narcissism: the wishful need for everything in the world to conform to how one already believes it to be. Bacon calls their attitude "sciences as one would" (1.49). To correct this, Bacon proposes "helps" (*auxilia*), and legitimate philosophical thought emerges only out of this artificial method, which Bacon calls "induction" (*inductio*) and which I would now like to examine more closely.

Bacon tends to describe induction in negative terms, by distinguishing it from the syllogism and from the mind's own tendency to leap from particulars to the most abstract, largest conclusions, which, however insecure or arbitrary they may be, then guide the mind in its subsequent investigations. The notions generated by the syllogism are suspect, first, on epistemological grounds, because the process of syllogistic reasoning is deficient:

There is no soundness in our notions, whether logical or physical. Substance, Quality, Action, Passion, Essence itself, are not sound notions; much less are Heavy, Light, Dense, Rare, Moist, Dry, Generation, Corruption, Attraction, Repulsion, Element, Matter, Form, and the like; but all are fantastical and ill-defined. (1.15)

. . . notions are ill-drawn from the impressions of the senses, and are indefinite and confused, whereas they should be definite and distinctly bounded. (1.69)

No one has yet been found so firm of mind and purpose as resolutely to compel himself to sweep away all theories and common notions [*Notiones communes*], and to apply the understanding, thus made fair and even, to a fresh examination of particulars. (1.97)

Most importantly, for Bacon syllogistic notions remain entirely verbal: "the syllogism consists of propositions, propositions of words; and words are the tokens and signs of notions" (9). Entangled in its vehicle of signification, the syllogism reverses the ontological priority of the notion, which, properly understood, does not follow from words but has an existence distinct from the words that express it: the notion is "the soul of words and the basis of the whole structure" (19), as Bacon puts it in the preface to the *Novum Organum*. The syllogism "commands assent . . . to the proposition, but does not take hold of the thing" (1.13); Aristotle is "always more solicitous to . . . affirm something positive in words, than about the inner truth of things" (1.63), and Bacon elsewhere describes Aristotle as having "enslaved" (Rees 1.54) his philosophy to his logic and compares his philosophy to the Ottoman, in that it destroys all other philosophies and rules absolutely (1.67). "The first and most ancient seekers of truth," he reminds us in his derivation of the aphorism, his preferred form of philosophical expression, "were wont . . . to throw the knowledge which they gathered from the contemplation of things, and which they meant to store up for use, into aphorisms" (1.86). However, when it comes to outlining his alternative inductive method, Bacon makes a surprising comment:

For no one successfully investigates the nature of a thing in the thing itself; the inquiry must be enlarged to things that have more in common with it [*sed amplianda est inquisitio ad magis communia*].<sup>4</sup>

And here we arrive at the passage that has prompted my line of inquiry. Having so often invoked the "thing" as the source of all epistemological authority, what can it now mean for Bacon to say that "no one successfully investigates the nature of a thing in the thing itself," an observation that he makes several times in the *Novum Organum*?

Taking Bacon's claim in its larger context, I propose, leads us to a central insight about his method: the importance he grants to "common" properties and thus also the nature of "commonness" as a principle of coherence and identity operating across several scales, from Bacon's account of the formation of axioms and of the all-important "Forms" of Nature to the natural bodies that are found there and that soon acquire a political type of organization. For Bacon, all true philosophical knowledge depends on commonality, which has both an operative (or manipulative) and an intellectual dimension: commonality is at once the *source* of all notions and is itself the *content* of a notion that returns to inform the formation of all others.

This two-fold dimension is visible, first, in the fact that Bacon's method depends on acts of assembling and collecting materials, the first step of his "natural and experimental history" (6) as he calls it. Once these particulars have been gathered together, the interpretation of Nature proceeds by sorting them into a formal arrangement so that they may be presented to the understanding. Only then can true induction proceed (2.10). "Experiment" begins with the writing of a list: with the imposition of a form that can sort through the variety of Nature, which otherwise "confounds and distracts the understanding" (2.10).<sup>5</sup> This is not to say, however, that we can evade this confusion by confining ourselves only to local examples that would seem to have something obvious in common, since in this way we again find only what we already recognize and know falsely; Bacon calls such gestures "anticipations," which collect only familiar occurrences close at hand and "fill the imagination" (1.28) with their vivid and seemingly self-evident truthfulness. True "interpretation," in contrast, deliberately embraces variety and collects "widely dispersed facts" (1.28). But these facts, at the same time, cannot be *too* diffuse, and herein lies the value of generalization and its vehicles: experiment, list, and table. Without them it remains impossible to discover any positive knowledge whatsoever, leading to the epistemological failures of the skeptics, who Bacon characterizes as "infinitely separated and opposed" (1.37) both to themselves and to others. The defect of existing natural history, Bacon complains, is that it is insufficiently rigorous in its procedures of collection (1.98); pursuing natural philosophy in this haphazard or myopic way, Bacon argues, would be similar to governing a state according to the gossip of the streets rather than by the reports of ambassadors and "trusted messengers" — "such exactly is the system of management introduced into philosophy with relation to experience" (1.98) under current practice.

Instead, true science must proceed differently, and the “strongest means of inspiring hope,” Bacon advises, “will be to bring men to particulars, especially to particulars digested and arranged in my Tables of Discovery . . . *since this is not merely the promise of the thing but the thing itself*” (1.92; emphasis added). Here again we find a variant on Bacon’s earlier phrase, with the important difference that now the “thing itself” can never be grasped by itself but only in relation to other things to which it is compared and from which it is differentiated, in a constant mental act of synthesis and analysis that is enabled by “experimental” forms of writing such as the table and the list. Bacon is very clear that this logical sorting, although it takes place in the mind, is equivalent to and aided by the physical manipulations of experiments (2.7), and this operative mental procedure is nicely captured by the Tables of Discovery, which are, after all, artifactual products that begin to think for us, on our behalf: they are the form of “*communia*,” in other words, as this principle emerges from or is rendered by or is translated through the procedures of experiment. We look for the thing “itself” and find it only embedded among other things, which are no less “themselves” when considered alone; each particular instance is *one* thing, but it is also in some sense less than one, since its integrity is bestowed upon it by a larger collection of particularities, no one of which is any more integral than the others. The act of assembling and collecting instances so that they can become authentic evidence for science depends on this constant gesture of comparison, in which the attention can settle only temporarily on any one instance before immediately moving to another in search of similarity and difference at once. A leap and split, ongoing and infinite:

For no man can rightly and successfully investigate the nature of anything in the thing itself; let him vary his experiments as laboriously as he will, he never comes to a resting-place, but still finds something to seek beyond. (11)

“Philosophy” turns out to be another name for an attitude of cultivated distraction, and “induction” the process of guiding and directing this infinitely extendable movement, hanging the understanding down with weights so that it does not immediately “jump and fly” (1.104) up to the broadest axioms imaginable but at the same time spurring it onward so that it never settles into a false knowledge of the “thing itself.”

Two important implications follow from this procedure. The first is that the act of collecting is always . . . collective. No more than a single thing could



contain true philosophical knowledge, no one single person could accomplish the collection of particulars that would constitute an adequate natural history that leads to the new notions and new axioms of reformed philosophical knowledge. Bacon often writes of the importance of *instituting* this procedure, whether as an act of sovereignty or in the form of new organizations in which the newly scientific method can live and prosper as a collective enterprise. James should be like Solomon, in that he should take “order for the collecting and perfecting of a natural and experimental history, true and severe (unencumbered with literature and book-learning), such as philosophy may be built upon” (6). These foundations will compensate for the current practice—again, a defective one—that men currently associate only through a discourse that distorts their vision; instead, a scientific association will take place through proper method, over the facts, notions, and definitions that it makes possible. Only then will we be led “to things themselves and the concordances of things” [*ad res ipsas, & rerum foedera adducimus*]; only then will we “add and contribute to the common stock,” as Spedding, Ellis, and Heath have it, or, more literally, “collect things together in common” [*vt ipsi videat, quid habeant, quid arguant, quid addant, atque in commune conferant*; 14]. And the knowledge that results from this collective method of collecting in common will be drawn from the “greater or common world” [*communi*] (1.42) rather than from the domains of immediate, subjective experience that for Bacon characterizes the Idols of the Cave, or those Idols that result from the distortions particular to our “own proper and peculiar nature” (1.42), our education, the books we happen to have read, and the authorities we respect.<sup>6</sup> Alone, we remain too particular to accomplish the true philosophical or scientific knowledge that we may achieve together, when aided by the tools and habits of induction.

Make no mistake, however: this promised association through a common method is in no way universal or democratic but describes an aristocracy of understanding that Bacon opposes strongly to the current state of affairs:

For however various are the forms of civil polities, there is but one form of polity in the sciences; and that always has been and always will be popular. (9)

We may very well transfer, therefore, from moral to intellectual matters the saying of Phocion, that if the multitude assent and applaud, men ought immediately to examine themselves as to what blunder or fault they may have committed. (1.77)

How does Bacon view the state of natural philosophy? The ancients lived in a state of confused pluralism, "torn and split up into . . . vague and multifarious errors" (1.76); today, despite increased agreement, "still on parts of philosophy there remain innumerable questions and disputes, so that it plainly appears that neither in the systems themselves nor in the modes of demonstration is there anything certain or sound" (1.76). To the one side, the tyranny of the multitude and the vulgar, to which exceptional men have bowed; to the other, the "dictatorship" of those few authors who have managed to secure a place of authority. In this world, private persons who exercise "liberty" and who try to investigate on their own produce only "mediocrities and middle ways" (9–10). Closing his preface, Bacon exhorts us "to lay aside all emulations and prejudices in favor of this or that opinion" and to "join in consultation for the common good" (*exutis opinionum zelis & praeiudiciis, in commune consulant*; 16), an exhortation that Spedding, Ellis, and Heath translate in the first person singular but that in fact appears in Latin as a first person *plural*—the voice of the *Novum Organum* itself is the grammatical expression of a collective subjectivity engaged in a common enterprise.<sup>7</sup>

### Axioms, Forms, and Natures

There is a second important dimension, however, to Bacon's comment that true knowledge never lies in the thing itself, and this is because "philosophy" depends not on particulars but on the discovery of more general axioms, both axioms of knowledge and axioms of works (1.103). These axioms, too, depend on the procedures of collection, analysis, and synthesis that generate proper notions; in fact, the notion is a kind of contracted axiom, as we shall see in a moment. In order to generate axioms, induction works in a "gradual" way, like walking up a very long flight of steps: Bacon describes it as a "rising" from particulars to mid-level conclusions and from there to even more important controlling ideas. It can be understood as a process of definition by means of *appropriate generalization*, in contrast to syllogistic reasoning, which, as we have seen, encourages the mind to "leap" immediately from particulars up to the highest and most general assertions about Nature:<sup>8</sup>

Now my plan is to proceed regularly and gradually from one axiom to another, so that the most general are not reached till the last; but then, when you do come to them, you find them to be not empty notions but well

defined, and such as nature would really recognize as her first principles, and such as lie at the heart and marrow of things. (20)

The other [true induction] derives axioms from the senses and particulars, rising by a gradual and unbroken ascent, so that it arrives at the most general axioms [*generalia*] last of all. (1.19)

Axioms are true generalizations about particulars, and they unify them (despite their perceived difference) by revealing the more common natures that they share; the axioms also generate new experiments, new tables, and new lists of particulars so that new natures, and the axioms that can generalize about *them*, in turn, can be further discovered. “For axioms rightly discovered and established,” Bacon advises, “supply practice with its instruments, not one by one, but in clusters, and draw after them trains and troops of works.” (1.70).

If the act of experiment always assumes a series of forms, the “axiom” is one of the most important; there are different scales of axioms, and different “positions” of axioms in relationship to one another. Currently existing, defective axioms are “just large enough to fit and take . . . in” [*ad mensuram eorum facta, & extensa*] a few particulars, and only those of a most general occurrence; “and therefore it is no wonder,” Bacon continues, “if they do not lead to new particulars” (1.25). More useful is the “middle” axiom, which is a generalized thought of a certain extent—as in the case of the defective, non-methodical axiom, Bacon literally uses spatial, measuring imagery to describe it:

But then, and then only, may we hope well of the sciences when in a just scale of ascent, and by successive steps not interrupted or broken, we rise from particulars to lesser axioms; and then to middle axioms, one above the other; and last of all to the most general. For the lowest axioms differ but slightly from bare experience, while the highest and most general (which we now have) are notional and abstract without solidity. But the middle are the true and solid and living axioms, on which depend the affairs and fortunes of men; and above them again, last of all, those which are indeed the most general; such I mean, as are not abstract, but of which those intermediate axioms are really limitations. (1.104)

But in establishing axioms by this kind of induction, we must also examine and try whether the axiom so established be framed to the measure of

those particulars [*ad mensuram factum eorum particularium*] only from which it is derived, or whether it be larger and wider [*amplius, & latius*]. And if it be larger and wider, we must observe whether by indicating to us new particulars it confirm that wideness and largeness as by a collateral security. (1.106)

For this reason, the axiom also can be said to have a “territorial” relationship to other axioms and other notions: a “middle axiom,” for instance, is really just a “limit,” a specification, or a contraction, of a general axiom, which is its genus and has an even larger extension.

At the other end of the scale, the act of generalization takes a more contracted form, which is really that of the “notion” itself: “this induction must be used not only to discover axioms, but also in the formation of notions” (1.105), Bacon tells us, and “it is necessary that both notions and axioms be derived from things by a more sure and guarded way” (1.18). Existing vulgar notions “are ill-drawn from the impressions of the senses, and are indefinite and confused, whereas they should be definite and distinctly bounded” [*terminatas et bene finitas*; 1.69]. But Bacon also condemns the empirical school of philosophy because it *fails* to make use of the “light of common notions [*notionum vulgarium*] (which though it be a faint and superficial light, is yet in a manner universal, and has reference to many things)” (1.64). The simple notions—heat, whiteness, consistency, solidity, weight, motion, humidity, and others like them, to cite several of Bacon’s examples—are, when properly understood, portable generalizations, or generalizations in a handy, compact form. They are the building blocks out of which we assemble our axioms about nature, and they are themselves actively produced by the method. And if we make them correctly, the notions will become themselves condensations or containers for the axioms that explain them. One large generalization will collapse into a smaller one, or the smaller one will expand into the larger. Once we have assembled the natural history of “heat,” in other words, and we have gathered particulars and bound them together, as it were, with the form of the generalization—for simple experience is no better than a “broom without its band” (1.82), as Bacon puts it—then we are able to produce “axioms” about the “form” of heat. We will have grasped nature and axiom all at once: we will hold a bouquet of notions, with their axiom-stems, or the notion will be like a translucent marble, and we will peer into it and see the axiom threaded through its center.<sup>9</sup>

Understood in this way, one could say that Bacon is developing a kind of experimental procedure for testing notions and, more importantly, for inventing new ones—for manufacturing or making notions out of the operative method he describes. Those notions in current use must be evaluated against the particulars that have been collected and scrutinized by means of induction, and these notions must be either dispensed with or redefined so that the interior composition of the notion, as it were, is reorganized so as to conform to the knowledge that has been generated by the axiom. These axioms then suggest new operations that will generate new notions in turn. Taken as an entire process, induction can thus be said to translate one kind of “commonness” into another, the merely vulgar into the truly philosophical.

This procedure requires a double movement, both a *negative* procedure of distinction or separation and a *positive* procedure of joining and assembling; the virtue of “generalization” as a principle of Bacon’s philosophy is that it enables both procedures to take place simultaneously. First, negation, leading to affirmation:

. . . the induction that proceeds by simple enumeration is childish; its conclusions are precarious and exposed to peril from a contradictory instance; and it generally decides on too small a number of facts, and on those which are at hand. But the induction which is to be available for the discovery and demonstration of sciences and arts, must analyze nature by proper rejections and exclusions; and then, after a sufficient number of negatives, come to a conclusion on the affirmative instances. . . . And this induction must be used not only to discover axioms, but also in the formation of notions. (1.105)

Elsewhere Bacon refers to the same process as one of employing “exclusions” and “separations” (1.69) of nature, and he observes that “it is the peculiar and perpetual error of the human intellect to be more moved and excited by affirmatives than by negatives; whereas it ought properly to hold itself indifferently disposed toward both alike. Indeed, in the establishment of any true axiom, the negative instance is the more forcible of the two” (1.46). The formation of the notion, and from the notion of the axiom, is thus at one level a process of paring away or of sculpturation. The act of collecting—of choosing and assembling in one place—provides a body of material on which to work, and this work is one of separation and distinction.

Bacon immediately states, however—we have just seen it in the previous passage—that by means of this negative process induction begins to isolate and define basic elements so that they emerge in a positive fashion:

In the process of exclusion are laid the foundations of true induction, which however is not completed till it arrives at an affirmative. (2.19)

Men's labor therefore should be turned to the investigation and observation of the resemblances and analogies of things, as well in wholes as in parts. For these it is that detect the unity of nature, and lay a foundation for the constitution of the sciences. (2.27)

This principle of unity determines Bacon's method as strongly as does a principle of negation and defines the ultimate goal of his philosophy, although this unity is, again, accomplished only through the various negative operations that he describes. One cannot read the *Novum Organum* without feeling that Bacon remains, in spite of his occasional Platonism and commitment to unity, a strongly pluralist thinker who is fascinated by abundance and the constant differentiation this implies:

. . . in all generation and transformation of bodies [*generatione & transformatione Corporum*], we must inquire what is lost and escapes; what remains, what is added; what is expanded, what contracted; what is united, what separated; what is continued, what cut off; what propels, what hinders; what predominates, what yields; and a variety of other particulars. (2.6)

Do we see a subject, or do we see a subject multiplied and swamped by its predicates—new predicates precipitated into new actions and new verbs out of the innumerable motions of matter?<sup>10</sup> So when Bacon claims that “no one successfully investigates the nature of a thing in the thing itself; the inquiry must be enlarged to things that have more in common with it” (1.70), we see in the principle of *communia* both a centripetal and centrifugal movement, an assemblage and a disintegration, a dilating of particularity into generality and a telescoping of generality back into particularity again. And this movement of rising and falling, of compression and dilation, of collecting together and anatomizing into parts, is not an accidental phenomenon, an “immanent” effect of which Bacon himself is unaware: it is an integral aspect of his “scientific”

method. It is absolutely necessary for the reformation of philosophy into a solid, living body of knowledge, and it is fundamental to the operative dimension of Bacon's philosophy, which is of course one of its most important and most "modern" aspects.

This double movement can easily be tracked throughout Bacon's argument. It accounts for his persistent interest in particulate images: the letters of the alphabet, which he returns to several times as an analogy for the many forms of nature; the notes of music; the "seeds of things," which contain much "latent virtue"; or the "scattered rays of light itself" (1.121). Several of his "instances"—the rules for operations in experiment that help determine judgment and isolate natures—work by identifying singular or unique natures that do *not* conform to other natures, but do so only so as to better identify the "common" nature that underlies both of them. Such is the case with the "Solitary Instances," which identify "subjects which have nothing in common with other subjects except that nature; or, again, which do not exhibit the nature under investigation in subjects which resemble other subjects in every respect in not having that nature" (2.22). Or the case of the "Singular Instances," also called "Irregular" or "Heteroclite":

They are such as exhibit bodies in the concrete, which seem to be out of the course and broken off from the order of nature, and not agreeing with other bodies of the same kind. For conformable instances are like each other; singular instances are like themselves alone. The use of singular instances is the same as that of clandestine, namely, to raise and unite nature for the purpose of discovering kinds of common natures [*communes naturas*], to be afterward limited by true specific differences. For we are not to give up the investigation until the properties and qualities found in such things as may be taken for miracles of nature be reduced and comprehended under some form or fixed law, so that all the irregularity or singularity shall be found to depend on some common form [*forma communi*], and the miracle shall turn out to be only in the exact specific differences, and the degree, and the rare concurrence, not in the species itself. (2.28)

Bacon cites as examples of singular instances "the sun and moon among stars; the magnet among stones; quicksilver among metals; the elephant among quadrupeds; the venereal sense among kinds of touch; the scent of hounds among kinds of smell;" and, "among grammarians . . . the letter S . . . on account of its easy combination with consonants." (2.28)

For all his insistence on minute particles, however, Bacon does not consistently espouse an atomist ontology of nature; indeed, he explicitly denies that the particles of which he speaks are the same as those of the ancient atomists, since these imply the existence of a vacuum and the “unchangeableness of matter.” Instead, he says, “we shall be led only to real particles, such as really exist” (2.8). His emphasis falls less on the existence of particles than on their “latent configuration in bodies” [*latentis Schematismi in Corporibus*] (2.7), i.e., on their arrangement as parts within a larger whole and on the processes that allow a whole entity to be assembled out of smaller parts. The ontology of the natural body thus derives not only from its form, or its combinations of forms, but also from its overall arrangement, which Bacon understands to be a physical framework infused by material spirits; his view of matter is in this respect more Paracelsian than Lucretian.<sup>11</sup>

Furthermore, when Bacon argues that “we are not to give up the investigation until the properties and qualities found in such things as may be taken for miracles of nature be reduced and comprehended under some form or fixed law, so that all the irregularity or singularity shall be found to depend on some common form” (2.28), we see how closely he associates a principle of form with the idea of commonness, which appears now as the effect of an underlying regularity and repetition throughout nature. The form sits across both negative and positive movements at once; it is the “true specific difference” or “nature-engendering nature” (2.1), but it is also that which emerges positively out of the negative process of induction:

Then indeed after the rejection and exclusion has been duly made, there will remain at the bottom, all light opinions vanishing into smoke, a form affirmative, solid, and true and well defined. This is quickly said; but the way to come at it is winding and intricate. (2.16)

Once identified, the form emerges as the primary unifying principle in Bacon's philosophy, for “whosoever is acquainted with forms embraces the unity of nature in substances the most unlike . . . From the discovery of forms therefore results truth in speculation and freedom in operation (2.3).”

The operative dimension to Bacon's philosophy is, of course, its most famous aspect, and I would simply like to point out that it, too, depends on the principles of commonness and collectivity that I have been emphasizing.<sup>12</sup> For natural bodies are themselves collections of simple natures, and the natures



may be correlated perfectly with their forms; understanding a body in a philosophical way requires us to hold it in a kind of suspension, disaggregating it into its simple natures and then recombining them to produce a new body according to the universal regularities that characterize the domain of Nature and make any individual bodies possible:

The rule or axiom for the transformation of bodies [*transformatione Corporum*] is of two kinds. The first regards a body as a troop [*turmam*] or collection [*coniugatione*] of simple natures. In gold, for example, the following properties meet. It is yellow in color, heavy up to a certain weight, malleable or ductile to a certain degree of extension; it is not volatile and loses none of its substance by the action of fire; it turns into a liquid with a certain degree of fluidity; it is separated and dissolved by particular means; and so on for the other natures which meet in gold. This kind of axiom, therefore, deduces the thing from the forms of simple natures. For he who knows the forms of yellow, weight, ductility, fixity, fluidity, solution, and so on, and the methods for superinducing them and their graduation and modes, will make it his care to have them joined together in some body, whence may follow the transformation of that body into gold. And this kind of operation pertains to the first kind of action. For the principle of generating some one simple nature is the same as that of generating many; only that a man is more fettered and tied down in operation, if more are required, by reason of the difficulty of combining into one so many natures which do not readily meet, except in the beaten and ordinary paths of nature. It must be said, however, that this mode of operation (which looks to simple natures though in a compound body) proceeds from what in nature is constant and eternal and universal, and opens broad roads to human power, such as (in the present state of things) human thought can scarcely comprehend or anticipate. (2.5)

Bacon's appreciation for the alchemists is never more visible than in passages such as this one; the name "gold" is exemplary not only as a substance of value but also as a signifier of ontological unity in general, as well as of the promise of Baconian method to *generate* that unity, and to do so, moreover, on the model of Nature's own ordinary habits. In Bacon's ontology of nature, the "form" thus operates across several levels: individual natures undertake particular motions according to the "forms" that act as their regulating laws; these natures, in

turn, collect together to constitute a larger body, whose "form" is a composite made up of the simple natures, motions, and forms that it contains; bodies then act in characteristic ways within the world of Nature and upon one another. For Bacon, "bodies are not acted upon except by bodies" (2.35); they have "a desire for mutual contact," or "of resuming their natural dimensions or tension" or "a desire of congregating toward masses of kindred nature" (2.66).

But the unifying power of the form derives as much from the operations and transformations it makes possible as it does from any intrinsic property; as Antonio Pérez-Ramos has shown, Baconian philosophy is a "maker's knowledge" because it locates both its epistemological *and* its ontological certainty in the fact of material operation.<sup>13</sup> If a given nature "is," then it can also be known through a definition, but it can be known and defined only because it can be made or reproduced. And if it can be reproduced, then it can be confirmed to exist as an actually existing thing:

For since the form of a thing is the very thing itself, and the thing differs from the form no otherwise than as the apparent differs from the real, or the external from the internal, or the thing in reference to man from the thing in reference to the universe, it necessarily follows that no nature can be taken as the true form, unless it always decrease when the nature in question decreases, and in like manner always increase when the nature in question increases. (2.13)

One body changes and mutates, takes many different particular forms, joins and separates with other bodies and other natures. But another body resides immanently within it, and Bacon's reformed method attempts to reveal the metaphysical body that resides within the body natural:

Thus, let the investigation of forms, which are (in the eye of reason at least, and in their essential law) eternal and immutable, constitute *Metaphysics*; and let the investigation of the efficient cause, and of matter, and of the latent process, and the latent configuration (all of which have reference to the common and ordinary course of nature, not to her eternal and fundamental laws) constitute *Physics*. (2.9)

The passage provides yet another commentary on Bacon's earlier statement that "no one successfully investigates the nature of a thing in the thing itself;

the inquiry must be enlarged to things that have more in common with it [*sed amplianda est inquisitio ad magis communia*] (1.70): this “commonness” is to be found not in the thing but in the form, the more general, active force in Nature that underlies all particularity and is its true ontological principle.

### Bacon's Political Biology

What, then, are the characteristics of this Nature that Baconian method discovers? Bacon describes it as a pluralist world made up of independent bodies, each with own characteristic “appetites” and characteristics and each following its own actions according to the forms that make it up:

For though in nature nothing really exists besides individual bodies [*Corpora indiuidua*], performing pure individual acts according to a fixed law [*edentia actus puros indiuiduos ex lege*], yet in philosophy this very law, and the investigation, discovery, and explanation of it, is the foundation as well of knowledge as of operation. And it is this law with its clauses [*Paragraphos*] that I mean when I speak of forms . . . (2.2)

As both the “true differences of things” (73) and “laws of pure act” [*leges Actus puri*] (1.75), the forms reveal that in Bacon's philosophy of nature, the body natural and body metaphysical also constitute a body politic.<sup>14</sup> The “form” is not just a law of action but also one of free action, and it is also a law of governance and rule: “For when I speak of forms, I mean nothing more than those laws and determinations of absolute actuality which govern and constitute [*ordinant & constituent*] any simple nature . . .” (2.17).

As a principle of commonness, the form serves as something like a constitution for the natural body, which has its own *schema* or internal configuration. As Bacon writes of the “Instances of Companionship and of Enmity,” “he who well knows the constitution or configuration [*Constitutionem aut Schematismum*] of such a body will not be far from bringing to light the form of the nature under inquiry” (2.33). Since an important goal of Bacon's inductive method is to discover these “schematisms” so that they may be altered and modified, Baconian science suddenly begins to resemble a philosophy of constitutional innovation and even of revolution (“all violent motion is also in fact natural,” after all [1.66]). And this natural-political philosophy only becomes more interesting the closer we look. Here is Bacon on “Instances of Companionship and Enmity”:

Among Prerogative Instances I will put in the eleventh place Instances of Companionship and of Enmity, which I also call Instances of Fixed Propositions. They are those which exhibit a body or concrete substance in which the nature inquired into constantly attends, as an inseparable companion; or in which on the contrary it constantly retreats, and is excluded from companionship as an enemy and foe. For from such instances are formed certain and universal propositions, either affirmative or negative, in which the subject will be a body in concrete, and the predicate the nature itself that is in question. For particular propositions are in no case fixed. I mean propositions in which the nature in question is found in any concrete body to be fleeting and moveable, that is to say accruing or acquired, or on the other hand departing and put away. Wherefore particular propositions have no prerogative above others, save only in the case of migration, of which I have already spoken. Nevertheless even these particular propositions being prepared and collated with universal propositions are of great use, as shall be shown in the proper place. Nor even in the universal propositions do we require exact or absolute affirmation or negation. For it is sufficient for the purpose in hand even if they admit of some rare and singular exception. (2.33)

Henceforward we should probably describe all Schmittian political analysis not as neo-Hegelian but as neo-Baconian, since induction reveals an entire political ecology structured around the relationship between friend and enemy, figured as a state of exception, and embedded within a statement about the epistemological status of particulars, which exhibit an undecidable tendency. This "undecidability" lies in the mutations of natural bodies, in the infinitely self-differentiating or self-translating movement of nature itself, which proceeds by adding, subtracting, engrossing or dissolving predicates, and which Bacon understands as a process of "migration," or a movement between one body and another. Over this "complex" political ecology, the form stands as an executive sovereign principle, commanding order and common resolution so that universal propositions, however incomplete, unfinished, or undecidable they may be, are nonetheless useful, recycled into the new products of a legitimate philosophical method. Who decides the exception? Certain uniquely virtuous subjects endowed with both a body natural and a "body formal," which is defined as the capacity to act upon and rule over others. Here is Bacon on "Striking Instances . . . which I also call Shining Instances, or Instances Freed and Predominant":

They are those which exhibit the nature in question naked and standing by itself, and also in its exaltation or highest degree of power; as being disen-  
thrall'd and freed from all impediments, or at any rate by virtue of its  
strength dominant over, suppressing and coercing them. For since every  
body contains in itself many forms of natures united together in a concrete  
state, the result is that they severally crush, depress, break, and enthrall one  
another, and thus the individual forms are obscured. But certain subjects  
are found wherein the required nature appears more in vigor than in oth-  
ers, either through the absence of impediments or the predominance of its  
own virtue. And instances of this kind strikingly display the form. (2.24)

The aphorism provides an especially clear view of Bacon's quasi-Machiavel-  
lian ontology of sovereignty, in which one subject has the power to rule over  
all bodies and thereby generate legitimate philosophy principles out of a  
"common" relation.

It is enough to read the many prefatory materials to the *Great Instauration*  
or the *Advancement of Learning* to see what importance a principle of sov-  
ereignty has in Baconian philosophy; the very notion of "Prerogative Instances,"  
too, reminds us that James had been forced to defend the royal prerogative  
(the most important principle of sovereign exception) in the face of legal chal-  
lenge from the courts of common law and the House of Commons. What is  
less often recognized, however, is that Bacon's political ontology of sovereignty  
always also coexists with another, more pluralist and "collective" model that  
permeates all levels of his system, from the world of nature, to the procedures  
of scientific inquiry, to the formation of axioms and notions, to the operations  
that will assemble and disassemble new bodies. We can recognize the model  
from the *New Atlantis*, where the institution of Solomon's House functions as  
a kind of machine for collecting the evidence necessary to refining notions and  
generating new principles of operation.<sup>15</sup> I will call it a political ontology of  
"composition": an ontology of politics as a "bringing-together-in-the-same-  
place" and of what takes place when many bodies are brought together.

This political ontology of "composition" tends to fork in two different di-  
rections in Bacon's work. One direction points toward unity: a compositional  
politics that does not merely collect and gather but that joins and combines  
into harmony, agreement, and resolution. Bacon himself states it as explicitly  
as we could ask him to at the end of the great aphorism on varieties of natural  
motion:

the more common the good sought, the stronger the motion. Thus the motion of connection, which regards communion with the universe, is stronger than the motion of gravity, which regards only communion with dense bodies. Again, that appetites which aim at a private good seldom prevail against appetites which aim at a more public good, except in small quantities—rules which I wish held good in politics. (2.48)

Lisa Jardine has pointed out the several ways in which Bacon sought analogies between natural, ethical, and civil philosophies, despite the differences in the types of knowledge the latter might produce (i.e., probable knowledge rather than certain).<sup>16</sup> “It may also be asked,” Bacon writes, in anticipation of the question:

... whether I speak of natural philosophy only, or whether I mean that the other sciences, logic, ethics, and politics, should be carried on by this method. Now I certainly mean what I have said to be understood of them all [*de vniuersis*]; and as the common logic [*vulgaris Logica*], which governs by the syllogism, extends not only to natural but to all sciences, so does mine also, which proceeds by induction, embrace everything. For I form a history and table of discovery for anger, fear, shame, and the like; for matters political; and again for the mental operations of memory, composition and division, judgment, and the rest; not less than for heat and cold, or light, or vegetation, or the like. (1.127)

If moral philosophers who inquire after the good would simply study nature, “they would have saved and abridged much of their long and wandering discourses of pleasure, virtue, duty, and religion,” since “the appetite that is in all things to receive and to give; the one motion affecting preservation and the other multiplication” is a better guide to moral principles, as is “the motion of congruity or situation of the parts in respect of the whole, evident in so many particulars” or “the motion (familiar in attraction of things) to approach to that which is higher in the same kind.”<sup>17</sup> Many of the natural motions Bacon identifies show a unifying tendency that he identifies as “political”:

Let the sixteenth motion be the *royal* (as I call it) or political motion, by which the predominant and commanding parts in any body curb, tame, subdue, and regulate the other parts, and compel them to unite separate,

stand still, move, and range themselves, not in accordance with their own desires, but as may conduce to the well-being of the commanding part; so that there is a sort of government and polity exerted by the ruling over the subject parts. (2.48)

If this were all the political ontology that Bacon's science amounted to, then it would be an interesting footnote in a long history of political concepts with which we are familiar. But what makes Bacon's work genuinely fascinating and novel, at least in my view, results from his dogged commitment to exhaustive description, to taxonomy and fine categorization—to subtlety, in a word, and from his drive to multiply examples and uncover hitherto unrecognized actions, motions, and forces. Some natures show us how unity might be accomplished: the modalities, the violence, even the affects that are necessary to unification into a common composition. Other natures pull against one another, or struggle, or simply refuse, in an act of natural passive aggression, to participate in any larger commonality. Bacon's political ontology, in short, is *defined by the tension and even violence that inheres between a notion of the "common" and a notion of the "collective"*: bodies may be "collections" of simple natures, but these natures are not always in agreement and are not always in common with one another.

Aphorism 48 in Book 2, on the nineteen different motions of nature that Bacon collects under the heading *Instantias Luctae*, is a fascinating study of this strange political ecology. Spedding, Ellis, and Heath translate *Instantias Luctae* as "Instances of Strife," but Rees's translation (as amusing as it may sound) is probably more accurate: they are "Instances of Wrestling." I have already cited some examples of the key movements that characterize this natural *polis*, but they also include, among the minor and major motions, "resistance," "connection and contact," "delight," "liberty" and "desire," "escape," "embracing," "hostility," "need," "appetite," "exciting friction," "malignancy," "friendship," "choice," "flight" and "antipathy," "dominance," "assimilation," "self-multiplication," "excitation," "order," "force," "command," "trepidation," "perpetual captivity," "uneasiness" and "trembling," "restlessness" and "striving," and the motion that Bacon describes as "aversion to movement" or "the motion of refusal to move." I will let the fourteenth motion stand as an emblem for all the others:

Let the fourteenth motion be the motion of *configuration* or *position*, by which bodies seem to desire not union or separation, but position, collocation, and configuration with respect to others. This motion is a very abstruse one and has not been well investigated. . . . (2.48)

Perhaps one of the lessons that this compositional ontology of politics might teach us is that we should begin thinking about politics not in terms of unified subjects, shared properties, and common agreement (the political imaginary of More's *Utopia*, say) nor in terms of sovereignty, negation, and decision (the arguments of Schmitt and Derrida) but rather in terms of *proximity* and its difficulties. And this would be a lesson to be drawn from any "ecology" of politics, too, in which a complex or systemic principle of "collectivity"—from the Latin *collegere*, to gather or draw together—jostles the "common" concept and refuses to speak with one voice. The city has always been a fundamental political category—many of us *desire* cities—because of the electrical friction that results from so many bodies being thrust together. Politics really does begin with the neighbor: with the body that you find, unexpectedly, sitting right beside you.

#### NOTES

I would like to thank Sezen Unluonen for her very generous assistance and acute attention to detail in the preparation of this essay, as well as Bryan Lowrance, Emily Shortslef, the anonymous reader for the *Journal for Early Modern Cultural Studies*, and the audience and contributors to the "Commons and Collectivities" symposium for their thoughts on the arguments that follow.

1. See, for instance, Bennett, esp. 94–109; and DeLanda.

2. In posing the problem in this way, I mean to signal a fundamental similarity, in both question and method, with the pioneering work of Rogers in *The Matter of Revolution*, as well as to mark a slight difference in emphasis, since I will be focusing not only on the "analogical poetics of ontological speculation" (xi), as Rogers neatly puts it, between natural philosophy and politics in the period but on the way in which the intellectual configuration of both domains emerges out of a prior and ongoing project in Bacon's work, which concerns the definition of "philosophy" in general, its range of possible extension, and its reform as a mode of human knowledge. Rogers does not discuss Bacon in the context of the later Vitalist moment he identifies, perhaps because Bacon's philosophy of matter does not fit as easily with the individualistic, decentralized, and protoliberal political philosophy he discerns in Vitalist theories (e.g. 12). But Bacon's own philosophy of matter does contain important Vitalist elements; I would describe its political vision as "pluralist" rather than as protoliberal. Compare Pérez-Ramos's methodological comments on conceptual "ingredients" in *Francis Bacon's Idea of Science* 44–47. The relationship between Bacon's natural and political philosophy has also been recently examined with great originality and insight by Cohen, which any reader should consult.

3. I hope to feature the second three in a separate study. All English citations from the *Novum Organum* are from the Library of Liberal Arts edition, by book and aphorism number (e.g. 1.97) or by page number (when citing from the preliminary materials). Latin citations are from *The Instauration magna*, ed. Rees; in a few instances, I have used the English translation by Rees, as noted parenthetically. Citations from other works are from *The Works of Francis Bacon*. All italics are original unless otherwise noted.



4. See 1.70 for Bacon's quotation; compare variations on the passage in 1.88 and "Preface," 11. Here I have adopted the English translation by Rees in his edition of the *Novum Organum*, since it is more literal than that of Spedding, Ellis, and Heath, who render the final phrase as "so as to become more general."

5. On Bacon's use of lists and tables, see Jardine 120–32 and 135–41; Rossi 202–06 and 214–15, citing examples from across Bacon's work and emphasizing the importance of the topics and the commonplacing tradition; see also Turner 578–89; on lists in the history of science more generally, see Delbourgo and Müller-Wille.

6. In his note to the passage, Rees points to Sextus Empiricus, *Against the Logicians* as a source and comparison: "he most expressly declares that the common reason (*ton koinon logon*) is the criterion, and that the things which appear in common are trustworthy as being judged by the common reason, whereas those which appear privately to each man are false" (Rees, *Novum Organum*, 509 n. to I.42 ll. 15–17).

7. Harkness observes that Bacon's own procedures for reading and taking notes depended on gleaning insights from the work of others and then passing them on to his servants, who would write them up into his notebook; see 248–51.

8. On generalization in Bacon's work, see Jardine 80–81, 133–49 (in natural philosophy), 150–68 (in ethics and civics); also her account of *philosophia prima*, 101, 104–07 and 104n1; see also Anderson 85–90. On Bacon's notion of the axiom, see Jardine 8 and Rossi 145, both of whom trace it to Ramus, as does Fletcher 157–69; see also Pérez-Ramos 239–69, esp. 243–44 and 254–55, an account that tends to emphasize the role of negative or eliminative procedures in Baconian induction rather than those of assembling and collecting (to the point of suggesting that Bacon's lists and tables do not primarily generate "data conducive to generalizations" [260], a point that seems obviously disputable).

9. In the earlier *Partis instaurationis secundae delineatio et argumentum* (1607), Bacon himself offers a geometrical analogy: the axiom forms the solid part of a truth, while the simple notion is an image of its upper surface (*haec enim est veritatis portio solida, cum simplex notio instar superficiei videri possit*); see *Works* 7: 41–55 (51); cited by Anderson 88.

10. On Bacon's ontological pluralism, see Pérez-Ramos 88 and 97–105; on Bacon's Platonism and the importance of unity (over multiplicity) in his thought, see Anderson 127–31.

11. On Bacon's changing attitudes toward atomism over the course of his career, see esp. Rees, "Francis Bacon's Semi-Paracelsian Cosmology"; Rees, "Matter Theory: A Unifying Factor in Bacon's Natural Philosophy?"; and Rees, "Atomism and 'Subtlety' in Francis Bacon's Philosophy"; Kargon 43–53 and 70–79; Anderson 70–79; Gaukroger, esp. 175–220; and Barbour, "Bacon, Atomism, and Imposture" 17–43. On Bacon's use of Democritus and Epicurus to think through problems of political authority and the nature of divine providence see Barbour, *English Epicures and Stoics* 21–36 and 79–91; on Bacon's hybrid atomism and the importance of Lucretius to his own ethical, scientific, and political project see Cohen 197–218; on Lucretius as a figure for the continuity of knowledge over time in Bacon's work (by way of a meditation on Homer), see Passannante, esp. 91–92 and 122–53.

12. See Jardine 114–17, and her account of Bacon's theories of matter, forms, and qualities, 109–14; Rossi, esp. 1–35, and his account of the forms, 201–02; Pérez-Ramos, *passim*, esp. 91–132; Anderson 89–90 and 154–63; Emerton, esp. 66–69; and Passannante 142–43, arguing that Bacon's notion of form is Lucretian rather than Platonic or Aristotelian.

13. See Pérez-Ramos, esp. 48–62, 67, 106–14, 117, 135–49 and 150–66.

14. See Rogers, who argues that "self-moving matter, for all the participants of the Vitalist Moment, functions as a flexible, politically resonant form of ontological speculation" (2) and singles out the two problems of "agency" and "organization" as central points of

conceptual translation between natural philosophy and politics; see esp. 2–8; Bacon's notion of "*Schematismus*" ("configuration" or "schematism") is usefully understood in light of Roger's treatment of the idea of "organization" in seventeenth-century English thought. On relations between scientific and political concepts in Bacon's work, see also Martin, emphasizing the influence of Bacon's legal training on his theory of induction; see Pérez-Ramos 123–32 (on natural law).

15. Harkness has recently described Solomon's House as a "dressed up representation of the real world of science in Elizabethan London" (213), and she argues that Bacon's vision in fact minimizes and tries to eliminate from its vision of scientific inquiry (later taken up by the Royal Society) the empirical and collective practices of the city, where scientific knowledge depended on many networks of exchange and interaction, many of them structured through local, corporate institutions; see esp. 211–53 and 142–80.

16. Jardine writes: "A striking feature in Bacon's attempts to systematize the 'inexact' sciences according to the principles of natural science, is this trust in what to us appear to be the metaphorical possibilities of words . . . in appealing to verbal similarities for the universal principles common to all sciences Bacon deliberately endorses analogy (and accidental play on words) as serious tools of investigation in all sciences" (153; see also 159–68, esp. 161).

17. Qtd. in Jardine 160. See *Valerius Terminus* in *Works* 6: 44.

#### WORKS CITED

- Anderson, F. H. *The Philosophy of Francis Bacon*. Chicago: U of Chicago P, 1948.
- Bacon, Francis. *Novum Organum*. Ed. Fulton T. Anderson. Trans. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath. Library of Liberal Arts ed. Indianapolis: Bobbs-Merrill, 1960.
- . *The Instauration magna: Part II, Novum Organum*. Ed. Graham Rees. Oxford: Oxford UP, 1996.
- . *The Works of Francis Bacon*. Ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath. 15 vols. Boston: Taggard, 1861.
- Barbour, Reid. "Bacon, Atomism, and Imposture: The True and the Useful in History, Myth, and Theory." *Francis Bacon and the Refiguring of Early Modern Thought: Essays to Commemorate the Advancement of Learning (1605–2005)*. Ed. Julie Robin Solomon and Catherine Gimelli Martin. Burlington: Ashgate, 2005. 17–44.
- . *English Epicures and Stoics: Ancient Legacies in Early Stuart Culture*. Amherst: U of Massachusetts P, 1998.
- Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke UP, 2010.
- Cohen, Jason. "Political Power in Francis Bacon's Systems of Natural Knowledge (1603–1623)." Diss. U of Wisconsin-Madison, 2008.
- "Concept." *The Oxford English Dictionary*. Oxford: Oxford UP. Online. 11 April 2013.
- DeLanda, Manuel. *A New Philosophy of Society: Assemblage Theory and Social Complexity*. London: Continuum, 2006.
- Delbourgo, James, and Staffan Müller-Wille, eds. "Listmania." A focus section of *Isis* 103.4 (2012): 710–52.
- Emerton, Norma E. *The Scientific Reinterpretation of Form*. Ithaca: Cornell UP, 1984.
- Esposito, Roberto. *Communitas: The Origin and Destiny of Community*. Trans. Timothy Campbell. Stanford: Stanford UP, 2010.

- Fletcher, Angus. "Francis Bacon's Forms and the Logic of Ramist Conversion." *Journal of the History of Philosophy* 43.2 (2005): 157–69.
- Gaukroger, Stephen. *Francis Bacon and the Transformation of Early-Modern Philosophy*. Cambridge: Cambridge UP, 2001.
- Harkness, Deborah E. *The Jewel House: Elizabethan London and the Scientific Revolution*. New Haven: Yale UP, 2007.
- Jardine, Lisa. *Francis Bacon: Discovery and the Art of Discourse*. Cambridge: Cambridge UP, 1974.
- Kargon, Robert Hugh. *Atomism in England from Hariot to Newton*. Oxford: Clarendon, 1966.
- Martin, Julian. *Francis Bacon, the State, and the Reform of Natural Philosophy*. Cambridge: Cambridge UP, 1992.
- Passannante, Gerard. *The Lucretian Renaissance: Philology and the Afterlife of Tradition*. Chicago: U of Chicago P, 2011.
- Pérez-Ramos, Antonio. *Francis Bacon's Idea of Science and the Maker's Knowledge Tradition*. Oxford: Oxford UP, 1988.
- Rees, Graham. "Francis Bacon's Semi-Paracelsian Cosmology." *Ambix* 22.2 (1975): 81–101.
- . "Matter Theory: A Unifying Factor in Bacon's Natural Philosophy?" *Ambix* 24.2 (1977): 110–25.
- . "Atomism and 'Subtlety' in Francis Bacon's Philosophy." *Annals of Science* 37 (1980): 549–71.
- Rogers, John. *The Matter of Revolution: Science, Poetry, and Politics in the Age of Milton*. Ithaca: Cornell University Press, 1996.
- Rossi, Paolo. *Francis Bacon: From Magic to Science*. Trans. Sasha Rabinovitch. London: Routledge, 1968.
- Sextus Empiricus. *Against the Logicians*. 135. Trans. R. G. Bury. Cambridge: Harvard UP, 1997.
- Turner, Henry S. "Lessons from Literature for the Historian of Science (and Vice Versa): Reflections on 'Form.'" *Isis* 101.3 (2010): 578–89.