Regimens of the Mind

Boyle, Locke, and the Early Modern *Cultura Animi* Tradition

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Contents

Introduction

In the preface to his celebrated *Micrographia* (1665), Robert Hooke reflected on the general aims of experimental natural investigations and wrote of a "universal cure of the Mind" that this new philosophy was called upon, and was able, to perform.[1] He also gestured toward the restorative office of such a (postlapsarian) cure: "The only way which now remains for us to recover some degree of those former perfections, seems to be, by rectifying the operations of the *Sense,* the *Memory,* and *Reason*." The rectification of the faculties and the partial recuperation of their strength, integrity, and mutual harmony were the route toward a Baconian double renovation of "light" and of "command over things."[2] Similarly, in his apologetic *History of the Royal Society of London* (1667), Thomas Sprat considered the way in which the experimental philosophy was "usefull for the cure of mens minds": it "will supply our thoughts with excellent *Medicines,* against their own *Extravagances,* and will serve in some sort, for the same ends, which the Moral professes to accomplish." There was a moral dimension to the new, "Real Philosophy" promoted by the Royal Society, which, Sprat explained, rested not on some new moral doctrine it might formulate, but rather on its capacity to serve as a practice that cultivates the moral person: experimental study will have a sure effect on the inquirers "in the composing, and purifying of their thoughts."[3]

The purification, rectification, and reordering of the human mind were thus inscribed among the general aims of the experimental natural philosophy, as two of its prominent

advocates in later seventeenth-century England saw it. The notion was not new, though, and Hooke and Sprat were looking back to the model figure of the Royal Society in formulating this claim. Francis Bacon had indeed written of a "purging," a "medicining," or a "culture" of the mind, provided by the reformed disciplines of his tree of knowledge, in particular by the moral and the natural philosophies.[4] His new method of natural inquiry (or his new "logic") offered, he claimed, "helps" (*auxilia*) and "ministrations" (*ministrationes*) to the human faculties, and thus a route toward a partial restoration of man's prelapsarian mental powers.[5] Later in the century, Robert Boyle and John Locke rehearsed the notion that a well-framed pursuit of knowledge could provide remedies for the "infirmities," "weaknesses," and "blemishes" of the mind of man.[6] They no longer spoke of a possible restoration of Adamic powers in this life, but rather emphasized the work of an education of the mental capacities to which they assigned a strong moral-religious value. Their recommendations for the rightful pursuit of truth were meant to indicate a way to a "perfecting" of the mind.[7] To perfect the mind was emphatically a process ("perfection" itself could not be an achievement of this life), one that had to organize the "pilgrimage" of the Christian philosopher's life. It was also a work that involved all the capacities of the mind, cognitive, volitional, and affective alike.

My concern in this book is to highlight the early modern English experimental philosophers' views about the cure and perfecting of the human mind and to show that such views were fundamental to their epistemological and methodological projects. These projects will thus be reintegrated in what I propose is their original conceptual matrix, one organized by the idea that the rightful pursuit of true knowledge is a process that takes the form of regimens for the entire mind. This conception comprises the related notions of a need to diagnose the state of one's cognitive and affective faculties through self-examination, and of a possibility—as well as duty—to cure their infirmities and cultivate their strengths. The cure and the cultivation are undertaken both as an office of the rational creature and as a task assigned to it by its Creator, and they have a central place among the values that govern the human being's life as an individual, as a member of a community, and as a creature in relation to its deity. I would like to argue that, for the English experimental philosophers who are the main characters in this book, such a paideic concern[8] with the human mind formed the ground of their views about the acquisition and transmission of knowledge, about the limits and possibilities of reason, about the governing of assent and the rightful conduct of inquiry across all domains of learning.

The focus of this book will be on Boyle and Locke, whom I take to be conspicuous proponents of the regimen approach to the pursuit of knowledge in later seventeenth-century England. The second part of the book will be entirely devoted to them. But I also want to show that their views are informed by a coherent line of reflection developed by early modern English proponents and apologists of the experimental philosophy, begun by Francis Bacon and continued by the Royal Society virtuosi. The first part of the book will therefore be partly devoted to Bacon's and the virtuosi's views about experimental philosophy as a paideic practice for the mind.

The experimental philosophical context will naturally focus the investigation on such views as bearing on the study of nature. Nevertheless, it will be seen that nature is only one of the domains of inquiry where the double pursuit of truth and of a fortified mind comes into play for Boyle and Locke. While the study of nature was indeed the prime domain relative to which an *experimental* methodology was formulated, the notion of *experience* understood as the guide to rightful study was applicable to other domains that the Christian philosopher was expected to include in his endeavors. These domains included the whole of creation—or the whole of "God's works"—with its material and nonmaterial levels, as well as God's written testimony, Scripture. They traced a territory of inquiry where experience was expected to inform reason, and thus to increase knowledge and understanding, while at the same time serving as a curing and perfecting practice. The paideic role that inquiry across all these domains had for Boyle and Locke is best grasped, I will propose, by recognizing the prominence in their writings of the figure of the inquirer. Their epistemological and methodological views relative to the study of both nature and Scripture are filtered through accounts of the failures and the accomplishments of those who engage in that study. It is as an explanation of those failures and accomplishments that the diagnosis of, and remedial proposals for, the mind acquire their full significance.

The historical point of this study is double: on the one hand, I want to show that there is indeed a coherent line of English thought that, despite variations and changes, develops a core doctrine that remains stable from Bacon to such Royal Society virtuosi as Robert Hooke, Walter Charleton, Joseph Glanvill, Thomas Sprat, and to Boyle and Locke. On the other hand, it will be seen that this development in the English natural philosophy of the seventeenth century is only partly original. What is original is the marshaling of experimental philosophy itself as a specific type of practice in the service of the preoccupation with the government and training of the mind. But that preoccupation was a larger phenomenon

of the time, one that permeated the cultural space of early modern Europe and that traversed a number of disciplines and genres. Therefore, a second contextual level of my investigation in the first part of the book will be constituted by the early modern literature on the "cure" and "cultivation" of the mind, with a focus on those authors that Boyle and Locke were familiar with. These authors will be, again, mainly English. This is not to deny the transnational scope of this type of literature, and in fact references to relevant Continental authors will not be absent from my survey. Similarly, references to the developments in the Continental "new philosophy" relevant to my subject—e.g., to Descartes, Gassendi, Pascal, and Port Royal—will also feature in various places in this book. Nevertheless, my English focus is meant to give a sense of the coherence of the reflections on the topic of the cure and cultivation of the mind in this national territory, throughout the century, and across a variety of genres and disciplines. This is not to say that it was an English phenomenon, but to try to account for the way this European preoccupation took (internally coherent) shape in England.

I treat this early modern literature under the heading *medicina* and *cultura animi,* in recognition of the core notions that organize its approach to the human mind: its professed aim was to offer "medicine" or "physick," or else to prescribe the best "culture," for a mind described as "diseased" or "distempered" or "perturbed." In turn, these notions explicitly elaborate on ancient representations of both philosophy and religion as such "cures" or "cultures" for the soul: they are thus jointly indebted to what I will describe as the Socratic and the Patristic/Augustinian traditions, which most of the early modern texts aim to combine in various ways. I will group these texts according to the most prominent genres they illustrate (treatises of the passions of the soul, anatomies of the mind, rhetorics, tracts of wisdom and of consolation), and I will particularly highlight the capacity of the treatise of the passions to accommodate a multigenre and cross-disciplinary approach in its own format. This will be to emphasize the noncompartmentalized nature of this early modern endeavor, which transgresses disciplinary as well as institutional boundaries, and whose practitioner is often called, with a comprehensive term, the "physician of the soul." The types of texts I will present have been approached before, as the quoted scholarship will indicate, but they have been treated separately, as they served the purposes of histories of rhetoric, of moral-medical writing, of religious discourse, or of moralist and psychological literature. What I want to emphasize here instead is the transdisciplinary nature of the preoccupation of these genres and the common ground they share. That common ground includes analyses

of the faculties and distempers of the whole mind and prescriptions of remedies and cultivating regimens, envisioned as life programs. I will use the term "regimen" as the best encompassing descriptor of the types of operations performed on the human mind they advocated, and thus as an equivalent of "cure," "cultivation," "education," "training," "government," or "discipline." In referring to these texts as a whole I will speak of *medicina-cultura animi* (with the short variant *cultura animi*) genres, texts, literature, as well as themes, attitudes, or approaches. In order to emphasize the coherence of this development through the late sixteenth and seventeenth centuries, and its resonance in the cultural space of the time, I will also refer to an early modern "*cultura animi* tradition" and to a "culture of regimens."

One key feature of the texts I will analyze in more depth is the integrated nature of their approach to the human mind, in particular to the cognitive and the affective, as well as to the intellectual and the moral, aspects of the life of the mind. This integrated approach is consistently pursued at all the levels of their endeavor: the diagnosis of the distempers, the formulation of the regimens, and the description of their outcome as either "virtues" or "health" of the mind. As such, these texts make room for analyses of error (as a member of the cognitive-affective distempers) and of the virtues of examination (as crossing the moral-intellectual divide), which represent remarkable epistemological developments in what could otherwise appear as (merely) moralist genres. While these developments are significant in themselves and testify to the emergence of a noteworthy approach to the problem of knowledge in an unexpected intellectual milieu, their main relevance for the present study lies in their contextual force. They form, I want to claim, the natural intellectual environment for the similarly integrated approaches to the mind's distempers, regimens, and virtues in the writings of Bacon, the virtuosi, Boyle, and Locke. These philosophers' programs include a vital component of life-guiding regimens that is best appreciated if seen against the *cultura animi* literature.

The general thesis of this book is that there is an anthropological-therapeutic core to the English experimental philosophers' approach to the problem of knowledge, the general features of which are concurrent with the same approach in the *cultura animi* texts. Their philosophical programs are premised on analyses of the limits, frailties, or distempers of the human mind and consequently framed so as to answer the need for an inner reformation. I will therefore propose that, in their case, the solution to the problem of knowledge takes the form of a solution to the problem of ordering the mind. The distinctive features of the early modern

English experimental philosophy that have to do with the general level of its epistemology and methodology and with the values and goals attached to it are, I want to show, shaped by the terms in which the anthropological-therapeutic core is formulated. The latter provides a central line of legitimation for the experimental, as opposed to the contemplative or speculative, way of natural inquiry, and it helps define a complex notion of the "utility" of natural philosophy; it reshapes early modern epistemological categories such as the limits of reason, probable knowledge, or moderate skepticism, and it governs the format of the rules, methods, and procedures of inquiry; it generates an equivalent to the modern notion of "objectivity" from which it nevertheless differs in crucial ways, and it provides an argument for the value of the communal nature of the experimental practice, as well as for its relevance to the problem of social order. In what follows I will draw a preliminary sketch of these themes, while also indicating the position of this argument in relation to current scholarship in the history of philosophy and of science.

In trying to reintegrate early modern approaches to knowledge into their original intellectual and cultural matrix, this book joins the recent challenge to the "epistemological paradigm" in historical understanding, according to which early modern philosophy was primarily confronted with the epistemological question of the justification of knowledge, following the historical event of the challenge of skepticism. This interpretative grid, various scholars agree, fails to recognize the complexity of the ways in which the early moderns themselves viewed the philosophical pursuits in which they engaged. For instance, with the epistemological paradigm aside, we may start to understand that for some of them at least, the pursuit of philosophical inquiry was organized by the idea of leading an exemplary life, rather than by the aim of constructing theories of knowledge and its possibility or justification, apart from any other intellectual or cultural motivation.[9] The attempt to understand the ways in which early modern philosophy incorporated the idea of a way of life has led to several fruitful lines of research in recent scholarship. In response to the revival of attention to the ancient notion of philosophy as an art of living, due primarily to Pierre Hadot's work, historians of philosophy and science have argued for the appropriateness of reconstructing *early modern* philosophical programs not only in terms of theoretical bodies of propositions or sets of scientific practices, but also in terms of practical regimens and formative disciplines for shaping the individuals engaged in the philosophical or scientific life. The core insight here is that the early modern appropriates the ancient view of philosophy as fundamentally *paideia* or *askesis* rather than simply *theoria*.

Two major and interrelated historiographic tools have governed research along these lines. One is the notion of *spiritual exercises,* which Pierre Hadot has shown formed the core of the ancient practice of the art of living,[10] and which scholars of early modern thought have used to reinterpret the philosophical, scientific, or political projects of seventeenth- and eighteenth-century thinkers. According to this historiographic perspective, various conceptions of the best solution for training or cultivating selves helped shape the metaphysical, natural philosophical, and mathematical pursuits of, for instance, Descartes, Pascal, Leibniz, or the competing civil and metaphysical philosophies in the German Enlightenment.[11] The other tool is the notion of the *persona* of the philosopher—an exemplary identity wrought by intellectual, moral, and even corporeal disciplines, one that represented an *office* (sometimes a noninstitutionalized one) in specific cultural spaces. Recognition of the historical relevance of this category, it has been proposed, enables us to understand the interlacing of the theoretical and the paideic components of philosophical (including natural philosophical) programs from the early modern age to the nineteenth century.[12] There is surely some measure of overlap between the spiritual exercises and the persona approaches. Stephen Gaukroger made the link in his study of Francis Bacon, as did Ian Hunter in his survey of the early modern German philosophical programs, or John Cottingham in his argument about a Cartesian philosophical *askesis*.[13]

I will propose that the philosophy-as-a-way-of-life framework is equally applicable to the experimental philosophical programs of early modern England. While this proposal may look unproblematic in view of the trend in early modern studies sketched above, there is nevertheless resistance to it even from within that trend. Resistance turns on the question of *the virtues,* or of the *inner* work of self-transformation and its fruits, which is associated with the idea of a way of life. As far as the early modern English philosophy is concerned, there is somewhat of a consensus about a shift toward the disengagement of knowledge from virtue (especially intellectual virtue) in the work of the experimental philosophers. Thus, Stephen Gaukroger took a persona and spiritual exercises approach to Bacon, but his study suggests that this approach can very well go together with a thesis about the breakdown of the concern with the virtues. According to Gaukroger, the Baconian reformation of the natural philosopher was no longer an inner reformation building personal excellence. A similar thesis has been put forward by studies that take the Aristotelian-Thomistic model of the virtues as the standard of analysis. John Cottingham, for instance, sees Descartes as indebted precisely to

such a model. By comparison, Bacon (as representative of the English experimental philosophy) appears as the antihero of the demise of the virtues.[14] Similarly, Peter Harrison argues for an exhaustion of the traditional models of the virtues (both the Aristotelian-Thomistic and the hermetic-mystic) in early modern England. The shift was due, Harrison argues, to the impact of the Protestant view about the radical and insurmountable corruption of man's intellect after the Fall. On this Augustinian conception of human nature, the individual was incapable of performing the kinds of inner transformations required for the attainment of moral and intellectual virtues. With fallen human beings, knowledge could be secured only at a social, cooperative level by means of procedures that were apt to achieve the external dependability of knowledge results without relying on the inner transformations of (corrupt) individuals. Impersonal methods thus superseded personal virtues on the route to knowledge.[15]

I would like to challenge this consensus on two fronts. One is a historical point that has to do with the model of the virtues taken as a point of reference: the Aristotelian-Thomistic and the hermetic-mystic models were not the only ones available in the early modern intellectual space, and I will argue that an alternative approach to the virtues of the mind is developed by the *cultura animi* genres. Theirs is an eclectic approach that interweaves Stoic, skeptical, and Christian virtues and that makes it possible to conceive of the virtues of the mind without associating them with the activity of (metaphysical) contemplation. It is precisely such a view of the virtues, I will argue, that is taken over by the English experimental philosophers. The other is a conceptual point about the type of anthropology at play in these philosophers' texts. It is, again, the *cultura animi* literature that shows how Augustinian views on the corruption of human nature could be integrated into accounts that allowed for the possibility of a human work of "perfecting" the capacities of the mind and of an (arduous) progress toward a condition of "health" or "virtue." I believe Harrison's anthropological approach to the early modern problem of knowledge is an insightful and fruitful historiographic line, and this book will also argue for the crucial role of the analysis of the faculties in the early modern philosophers' reflections on the pursuit and prospects of knowledge. Nevertheless, I will claim that the line of thought I am investigating relies on mitigated Augustinian accounts of human possibilities, which allow for inner reformation by means of a conjoined philosophical and religious work on the human mind. The role of the anthropological core of the English philosophers' accounts of knowledge pursuit was to trace the contours of a therapeutic and cultivating

regimen, which they thought experimental philosophy could serve as fruitfully as the disciplines of the "physicians of the soul."

There is indeed a consistent line of defense of the experimental approach to the study of nature in English thought from Bacon to Boyle and Locke couched precisely in terms of its capacity to conduct the mind in the right way toward the double acquisition of truth and of virtuous dispositions. The counterpart of the defense was a polemic attack on competing solutions to the conjoined problems of the legitimate pursuit of knowledge and of the right course for the progress of the mind, in particular on the mathematical and the contemplative, speculative philosophies. The latter have been the main focus of the recent spiritual exercises approaches, and such studies have indeed made a persuasive case for these philosophies' claim to a privileged position on the question of the pursuit of truth and of a rectified mind. From the opposite, experimental camp, though, things looked completely reversed. For the English experimental philosophers, speculation divorced from the detailed study of the particulars of nature simply failed on both accounts: it led to erroneous conclusions about the world and in fact sprang from, as well as reinforced, the perturbations of the mind. While the polemical opposition between experimental and speculative philosophy in the second half of the seventeenth century was indeed a major methodological issue, as Peter Anstey has shown,[16] it will be seen that the same opposition also rested on competing claims about the rightful regimen for the mind. It was, moreover, a later seventeenth-century issue that in fact had its roots in a fully developed Baconian theme.

This vindication of experimental inquiry also accounts for the vindication of its utility. The utility theme is usually addressed with unique reference to the experimental philosophers' reiterated designation of "works" for the public and of relief for humankind as a prime objective of their researches, and it is often interpreted in terms of the (later) notion of utilitarianism. Recent scholarship has challenged this association and has highlighted the role of seventeenth-century "utility" within a humanist-inspired social ethics.[17] But I want to show that this notion lies at the articulation point of a social ethics with an individual ethics: usefulness for the relief of man has as a constant counterpart in these philosophers' texts the usefulness of experimental inquiry for ordering and fortifying the mind of the inquirer.

The defense of experimental as opposed to speculative inquiry in regimen terms rests on a particular set of views about the legitimate sources of knowledge, about the limits, distempers, and "perfecting" prospects of

the human faculties, and about the kind of dispositions that constitute the mind's health or virtue. The highlighting of experience as the central source of knowledge (about the entire realm of things, natural as well as theological) is premised on a thesis about the limitations of the human intellect, coupled with a conception of the correct relationship between the human mind and the created world. There are only a limited number of truths that can be gleaned by contemplative introspection, and those pertaining to a comprehensive understanding of nature or Scripture are not among them. Experience is therefore the key learning instrument. On the other hand, few of the things learned through experience can acquire a high degree of certainty, since the complexity and depth of the natural and theological systems of things far exceed human capacities. Any new finding is in fact dependant on a larger scheme of things, and any conclusion is bound to remain tentative. At the same time, it is not only the complexity and depth of the system but also the constant threat of the distempered inclinations of the mind that argues for the need to remain cautious about findings and conclusions and to continue inquiry. It is against this background of considerations about the limits and weaknesses of the mind that, I will argue, the famous probabilism and skepticism of the experimental philosophy are endorsed. Such epistemological categories, which have been justly highlighted as one of the central features of the experimental philosophical program,[18] are reworked by its proponents in such a way that they not only represent appropriate responses to their anthropological position, but also function as appropriate therapeutic tools, serving a discipline of observation, judgment, and emotions, and issuing in such virtuous dispositions of the mind as constancy, humility, docility, generosity, or candor.

I will also argue that the accounts of mind dispositions (or "tempers") form the salient context of these authors' prescription of methods or rules for conducting inquiry and for governing belief formation. These rules, it will be noted, never amount to any strictly methodized or formalized procedure. Boyle's advice for the conduct of inquiry, Locke's rules for regulating assent, and the two philosophers' method for interpreting Scripture hardly constitute such a type of procedure.[19] The looseness of these rules makes sense, though, if they are taken as general guidelines for the inquirer's work, whose value lies in the personal progress of the inquirer rather than in the (apersonal) efficiency of the method. Philosophical methods and rules for regulating inquiry acquire the additional function of guidelines for the regulation of the mind's activities, and they are geared toward the double acquisition of true knowledge and of a healthy or virtuous disposition of the mind. The role of methods in

inquiry therefore does not overrule, but on the contrary supports, the cultivation of personal excellence. Inquiry is not geared to the obtaining of dependable knowledge and scientific results for their own sake, but involves a course of training for the minds of the inquirers as one of its core aims.

Such a cultivating role for methods is also allied with the development of what we might call an equivalent to the modern notion of "objectivity," which is nevertheless a virtue notion, often called "universality." The thesis about the emergence in the seventeenth century of a specifically English divorce of knowledge from virtue is often coupled with an account of the rise in the same context of the modern standard of objectivity. According to Peter Harrison, objectivity was a feature of the external dependability of impersonal methods, meant to placate individual corruption. According to Stephen Gaukroger, objectivity was an outcrop of the value of intellectual honesty that went into the making of the new persona of the natural philosopher. This value governed a new ideal of the acquisition of person-effacing qualities, meant to ensure collectively recognizable results rather than personal excellence.[20] Certainly, impersonal objectivity is itself a value, and as such it may well be seen to ensure the "moral integrity" of the experimental community or to organize a "moral economy" of science, as Steven Shapin, Simon Schaffer, and Lorraine Daston have argued.[21] Shapin and Schaffer have highlighted the social-moral values that legitimated the experimental "form of life" in the face of competing philosophies, and Shapin has built a case for the relevance of the early modern gentlemanly virtues for the exemplary moral standing of the experimental persona.[22] From this social historical perspective, objectivity is indeed recognized as a moral value that comes into play at the level of the community. But it is also the case that, as such, it remains exterior to the person and is thus indifferent to the question of the cultivation of self-transforming virtues. I want to argue that, for the experimental philosophers discussed in this book, the features of what will later be called "objectivity" are actually understood as virtuous dispositions acquired by disciplines meant to transform the "temper" of the philosophers' minds.

A related claim will be that the social dimensions of the English experimental philosophical programs of the seventeenth century can be seen as integral to the preoccupation with the moral-cum-intellectual grooming of inquirers. On the one hand, for the Royal Society virtuosi, as for the "physicians of the soul," the community was instrumental in the education of personal virtue and fulfilled a role similar to that of the "wise friends" in the *cultura animi* tradition. While the collective establishment

and validation of matters of fact was indeed one of the new functions of the experimental community, which Shapin and Schaffer have argued was jointly epistemological and social, I will suggest that another of its functions was that of a forum for purging distempers and cultivating virtues of the mind. "Civility" was indeed a communal desideratum of the virtuosi, but in the early modern culture, the referent of this virtue could include both polite manners and virtuous minds. It is true that civility as inner cultivation tended to lose ground under the pressure of civility as social form. Norbert Elias has described this process in terms of a tension between *Kultur* and *Zivilisation* in the modern German space, and Peter Miller has pointed to a similar phenomenon in early seventeenth-century France.[23] But it will be seen that for the English virtuosi the two referents of civility were still sides of the same coin. On the other hand, the advocacy of the exemplary standing of the experimental community as a model for the larger polity was also moored, I contend, to the question of the best cure and guidance of minds. Such advocacy was constructed in a polemical way, as was the defense of experimental inquiry: it included an attack on such forms of social disruption as "enthusiasm" or "dogmatism." Both philosophical and religious dogmatism and enthusiasm were castigated for their threat to the peace of the polity, while also being refuted as untenable epistemological positions.[24] But the crux of the argument was, again, the reference to the mental distempers responsible for such unrest: social sedition was seen as a fruit of sedition in the mind. I would like therefore to challenge the social historical perspective, according to which "solutions to the problem of knowledge are solutions to the problem of social order."[25] From the point of view of this study, it would be more accurate to say that for the early moderns the concern with the social dimensions of knowledge was rooted in a concern with the good ordering of the mind.

The book is structured in two main parts: the first traces the development of the themes I sketched above in the works of Francis Bacon and the Royal Society virtuosi (chapters 1 and 3) and illustrates the contours of the early modern *cultura animi* tradition in which these themes find their natural environment (chapter 2). I intend thus to build a case for the regimen dimension of the Baconian legacy of the Royal Society, by the side of the much more discussed methodological legacy, while also arguing for the inscription of this legacy in a wider culture of regimens. The Baconian, *cultura animi*, and virtuoso contributions to this approach to the problem of knowledge will subsequently be proposed as the relevant contexts for Robert Boyle's and John Locke's views on mind, reason, knowledge, and inquiry, which form the subject matter of the second

part of the book. In chapters 4 and 5, I will deal with their conceptions of the limits *and* the perfecting of reason, with their descriptions of the distempers and virtues of the entire mind, and with their general prescriptions for the conduct of inquiry (Boyle) and for the regulation of assent (Locke). I will also use this perspective to challenge recent interpretations of Boyle's views on "right reason" and of Locke's "ethics of belief." The last two chapters will look at the way the regimen idea informs their positions relative to the study of nature, with its natural philosophical and natural theological dimensions (chapter 6), and to the study of the entirety of "God's works" and of Scripture (chapter 7).

ONE

Francis Bacon and the Art of Direction

An art of tempering the mind

In an early text entitled "Letter and Discourse to Sir Henry Savill, Touching Helps for the Intellectual Powers," Francis Bacon approached the subject of education in a manner typical of his famous refutations of received learning. Philosophers, he tells us, had addressed the moral virtues in a satisfactory way, but had had nothing to say about "one principal part of the subject," the improvement of the intellectual powers. The neglect is due to a failure in appreciating the responsiveness of the entire man to training and government. Experience shows how various limitations, weaknesses, or defects of the body may be overcome by repeated exercise; equally, the will and affections are known to be capable of management and direction, as is manifest from the shaping powers of religious or moral philosophical exercises. But experience also makes it clear that the intellectual capacities, too, may be both governed and improved "by custom and exercise duly applied."[1] Observation rather than scholarly books will tell us that man in his entirety is, of all living creatures, "the most susceptible of help, improvement, impression, and alteration. And not only in his body, but in his mind and spirit. And there again not only in his appetite and affection, but in his power of wit and reason." It lies in the power of education to discover and to remove the "stonds and impediments of the mind," be they of the will or of the wit and memory, and thus to build

man's "virtues and good parts."[2] Bacon sketches a number of exercises for the intellect that he believes may form the required regimen,[3] but before doing so he delimits them from the arts of logic and rhetoric, which could be thought to serve the purpose, by means of an analogy: "For it is not part of the doctrine of the use or handling of an instrument to teach how to whet or grind the instrument to give it a sharp edge, or how to quench it or otherwise, whereby to give it a stronger temper."[4] Logic and rhetoric, at least as they are usually understood and practiced, are arts of "handling" the mind; what is needed, though, is an art of "grinding" it into a "stronger temper" before it can be used.

The *need* for such an art of tempering the mind[5] is premised therefore on an evaluation of the ordinary state of man's faculties as defective and weak. The *possibility* of such an art is premised on the observed educability of the same faculties. The philosophers' error was to form a narrow, one-sided conception of the susceptibility of the human powers to art-like government: in actual fact, it is not only the appetitive but also the rational faculties that are similarly defective and similarly capable of improvement. Both are educated by means of exercises, and for both the regimen of exercises results in virtuous dispositions. The importance of this early text lies in the clarity with which Bacon formulates his concern with the education of the mind and in the terms in which he conceives of this education: he takes its domain of application to be the whole range of the human powers (seen as frail yet capable of training) and its result, the building of virtues, both moral and intellectual.

Bacon devoted much thought throughout his career to the impediments, sometimes called "diseases" or "distempers," of the mind. He addressed the topic in a series of writings with subjects as diverse as religious meditations, moral advice, or the question of knowledge as bearing on natural philosophy, in several places of his *Advancement of Learning* (1605) and, most famously, in the doctrine of the idols of the mind in the *Novum Organum* (1620). In various ways, the discussions of the impediments are an integral part of a paideic, virtue-building scenario, the general pattern of which is sketched in his early "Letter to Savill." Such a conception, I want to argue, is one guiding vision of Bacon's program for the reformation of philosophy, central to which is a reformation of the practitioner of philosophy.

Although this Baconian theme has been addressed, most notably in Stephen Gaukroger's work, I would like to offer a different interpretation of what exactly the reformation in question means for Bacon. Gaukroger has developed a powerful argument according to which Bacon refashioned natural philosophy by modeling it on humanist moral philosophy.

The latter provided him with ways of thinking about the practical nature of philosophical pursuits (as a form of *negotium* or active life), as well as about the fashioning of a philosophical persona (or of the exemplary standing of the philosophical office).[6] But this transfer of models from moral to natural philosophy, Gaukroger argues, also involved a number of crucial shifts. While moral philosophy dealt with the passions of the mind and their cure, it was in his new natural philosophy that Bacon fully addressed the question of the "diseases" of the mind, this time understood not just as affective states, but as cognitive ones as well.[7] The purging of these diseases in the case of the natural philosopher took the form of an external regimen provided by the Baconian experimental method, the result of which was not a building of character but a subversion of it: instead of personal virtues, the natural philosophical method ensured routinized procedures and stood thus as the guarantee of objectivity.[8] The natural philosopher took on the role of a new sage, yet his purpose was no longer the good life; instead, his endeavors were guided by the aim of understanding and shaping natural processes, in keeping with the new practical, utilitarian notion of a natural philosophy geared toward providing public benefit.[9] Thus the philosopher made way for the scientist as the bearer of exemplary cultural values for the modern era.

Similar views about the Baconian program have received support from a different intellectual-historical perspective. In his analysis of the intellectual transformations of the seventeenth century in England, Peter Harrison proposes that, owing largely to a Protestant view of the human capacities, the general focus of the question of knowledge shifted from persons to methods. The Protestant attack on the human capacities and on the Aristotelian-Thomistic conception of virtue led to the abandonment of the assumption that the mind is naturally oriented toward the acquisition of knowledge, and to the demise of the intellectual virtues that once made wisdom and science close relatives. Nourished by a Protestant-Augustinian anthropology, early modern English experimental philosophy severed this link and gradually made room for a reified *scientia*—one that relied no longer on the interior cultivation of virtue but on an externalized philosophical regimen, ensuring the acquisition of knowledge by means of impersonal, objectifying procedures, available to anyone in the absence of any training of character, and issuing in an externalized body of knowledge whose quantitative accumulation was the task of a communal succession of inquirers. According to Harrison, the Baconian view of natural investigation was instrumental in this transition.[10]

The reading of Bacon's program I offer here is different in several ways, and it is guided by the terms of the Baconian view of the education of the powers of the mind, which I propose underlies his natural no less than his moral philosophy. Moreover, the interpretation of Bacon's views in this chapter may be taken as a template for the reading of the development of later seventeenth-century English experimental philosophy that I propose in this book as a whole.

In the first place, I want to argue that Bacon's natural philosophy draws, as does his moral philosophy, on a more fundamental doctrine, one concerned with the impediments and the regimens of the whole mind, with all its faculties. That doctrine is also developed in various types of early modern genres that are concerned with an art of "curing" the soul that parallels Bacon's art of "tempering" the mind. Their domain is not moral philosophy per se but rather a (philosophical and religious) *paideia* that imprints the right orientation on all branches of knowledge pursuit and on all forms of human activity. A more detailed investigation of this literature will be the task of the next chapter, while here I will look at how Bacon's conception of the art of tempering the mind nourishes both his moral and his natural philosophy. To this end, the next two sections will be devoted to the major features of this art: self-knowledge, understood as an investigation of the distempers of the mind, in the manner of a therapeutic diagnosis; the conception of a curative regimen, which Bacon called an "operation" upon the mind; and the set of virtues that form the horizon of the regimen.

Second, I reconsider the "utilitarian" reading of Bacon's natural philosophy. Surely, this reading is supported by his often reiterated claim that natural inquiry involves the production of "works" for the benefit of man, which comes with the scientific ability to control nature. But, as I am going to argue in the third section below, Bacon places this claim within a repeatedly resumed account of "the end of knowledge," which involves a double reference to utility as Christian-humanist philanthropy and to the mending and improvement of the human mind. Beneficial works for the public and a renovating work on the mind are, for Bacon, facets of the same process, and both form part of man's task of accounting for his gift of reason, a gift from his Creator.

In the third place, seen against this preoccupation with the analysis and reformation of the human mind (an anthropological-therapeutic concern), the natural philosophical method, or what Bacon calls his new logic, appears in a new light, as I am going to propose in the final section below. Rather than an external regimen understood as a routinized "mechanical rule" that, according to Gaukroger, "bypasses not only the

weaknesses of the mind but to some extent its strengths as well,"[11] Bacon's method can be coherently seen as a curative regimen for the mind. I would like to argue that, rather than overruling the virtues for the sake of objectifying method, Bacon can be seen as contributing in a powerful way to an early modern conception of the personal virtues involved in scientific inquiry. Three interrelated issues are involved in this argument: 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[12] 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 rather than of a mechanical, quantitative accumulation; and, grounding these notions, the *experimental* method of natural investigations is defended precisely for its capacity (in contrast to metaphysical speculation) of providing the right (cultivating) type of operation upon the mind.

The distempered mind and the tree of knowledge

The tree of knowledge in the second book of *The Advancement of Learning* reserves several places for the discussion of the distempered mind. They belong to the investigation of the human faculties, which is a branch of the investigation of the mind, itself a branch of "human philosophy." The faculties of the mind are divided into the understanding or reason and the will, appetite, and affections. Corresponding to these divisions are various "arts" whose role is to minister to the better functioning of the naturally erring or weak faculties. Under understanding, Bacon discusses the several "Arts Intellectual," and under one of them, the art of examination or judgment, he deals with the deficiencies of the "old logic" and particularly with the part of it devoted to (cautions against) sophisms. He is thus pointing to a new theory of error, one that would need to take into account "sophisms" of a kind that had no place in the old logic: in a "larger sense," Bacon says, they include "ambiguities of speech," "seductions of the imagination," as well as "a much more important and profound kind of fallacies in the mind of man."[13] All of these will be incorporated in the doctrine of the idols in the *Novum Organum*. While the profound fallacies of the mind properly belong to the art of examination, which, together with the art of inquiry or invention, serves the rational faculty, the troubles of and helps for the imagination are best addressed under another intellectual art, the art of elocution or tradition, which deals with rhetoric and the transmission of knowledge. A fourth intel-

lectual art, the art of custody and memory, takes care of the frailties and the training of the faculty of memory. Under appetite and will, Bacon discusses the two parts of moral philosophy, one devoted to the doctrine of the good, the other to what he variously calls the "Culture," the "Georgics," the "cure," or the "medicining" of the mind—the practical part of moral philosophy, whose role is to deal with the "perturbations and distempers" or the "diseases and infirmities of the mind."[14] The divisions of Bacon's tree of knowledge tell us, then, that there are infirmities of all the faculties of the mind: the understanding, the imagination, the memory, and the will and affections. They also tell us that there are several arts—the intellectual arts and the moral culture of the mind—whose role is to deal with these infirmities. In *De Augmentis Scientiarum* (1623), the expanded Latin version of the *Advancement,* Bacon calls the first group in its entirety "logic" and the second "ethic."

The divisions among the arts and the infirmities serve a classificatory purpose that answered Bacon's project of mapping the territory of received knowledge and of indicating the areas in need of reformation. But it is also the case, as Bacon himself suggests, that in the actual functioning of the mind, such divisions are never so neat. On the one hand, the several arts serve a common purpose, which makes them related branches of a unique endeavor. Bacon writes that "logic" and "ethic" are "twins by birth"[15] and that the arts for mending and directing the mind work together toward the same end, the "advancement" of reason:

> For the end of Logic is, to teach a form of argument to secure reason, and not to entrap it; the end of Morality is to procure the affections to obey reason, and not to invade it; the end of Rhetoric is, to fill the imagination to second reason, and not to oppress it.[16]

While each of these arts has its separate aim, they also fulfill a common purpose, serving as instruments for tending and guiding the faculties of the mind. Moreover, the arts of logic and ethics in particular themselves need to be reformed precisely in such a way as to become more readily amenable to the purpose of tempering the mind. On the other hand, the infirmities these arts minister to are also treated separately for the sake of cartographical neatness, but in the actual functioning of the human mind, they combine with each other in complex ways. Bacon's sensitivity to the interlacing of cognitive, appetitive, and affective distempers in the life of the mind will be the main concern of this section.

The "perturbations and distempers" Bacon identified as the stuff of the "culture of the mind" in his *Advancement of Learning* are common names for the passions of the soul or mind, which formed the main subject of

a growing body of literature in the early modern period, to which I will come back in the next chapter. The distinctive feature of a number of such early modern investigations of the passions is that they sought to unravel the complex relations between the passions and the errors of judgment.[17] Bacon adopts precisely this pattern of thought in his early writings. In the *Meditationes Sacrae* (1597), he approaches several phenomena of the mind that bear on one's moral or religious life and uses the language of "distempers" to broach the conjoined effects of passions and errors on weak minds. For instance, he identifies a "corrupt understanding" as the core flaw behind Puritan religious zeal and describes it as the "distemper and ill complexion of the mind."[18] Likewise, he analyzes the mechanism of misplaced hope, seen as a species of immoderate desire, in terms of the motions of a mind inflamed by uncontrolled evaluations, coupled with an "infection and tincture of imagination" that accounts for the fixation on the object of one's desire. This makes the mind "light, frothy, unequal, wandering," to the ruin of its health and tranquility.[19] In an earlier text, "In Praise of Knowledge" (1592), Bacon addresses in similar terms a theme that he was to pursue in ever more elaborate form through his mature writings: the impediments to knowledge (especially natural philosophical knowledge) rooted in the distempered mind. The mind's "ill proportioned estimation" and "vain imaginations" form "the clouds of error that turn into the storms of perturbation."[20] Toward the end of his life, in his essay "Of Truth" (1625), Bacon's diagnosis of the distempered mind remains the same: what blocks the pursuit of truth, which is to be considered man's supreme good, are "the vain opinions, flattering hopes, false valuations, imaginations as one would," sometimes the "melancholy and indisposition," and generally the "depraved judgments and affections" of man.[21]

Bacon's doctrine of the idols of the mind, which in the *Novum Organum* features as his analysis of the distempered mind placed specifically within the context of the reformation of natural philosophy, is a development and systematization of this constant preoccupation with the multifarious nature of the ill-functioning of the entire set of the human mental faculties. Although the doctrine is fully and explicitly developed in the early 1620s, in the first book of the *Novum Organum* and the fifth book of the *De Augmentis,* intimations of it feature already in the earlier *Temporis Partus Masculus* (1603), *Cogitata et Visa* (1607), *Redargutio Philosophiarum* (1608), and especially in *Valerius Terminus* (1603) and the first book of the *Advancement of Learning,* both devoted to the "impediments" or "diseases" of learning. The first general sense of the Baconian "idols" is that

of erroneous notions, opinions, or doctrines, to which are attached observations about the mental processes responsible for them, in particular the "hasty abstraction from facts."[22] In a second sense, however, the idols are seen as products of a particular condition of the mind itself—of its "ill complexion" (*mala complexione mentis*) or its "corrupt and ill-ordered predisposition" (*praedispositione mentis prava et perperam constituta*)[23]—and the bulk of the discussion of the idols is devoted precisely to the features of this ill complexion, with its attendant distempered functioning of the operations of the mind.

I would like to offer a reading of the idols that departs from the usual manner of presenting them, which is to treat them separately from the other Baconian lists of distempers and to follow the order of Bacon's listing, through the four classes of idols.[24] (These four classes are, famously: the idols of the tribe, rooted in human nature itself; the idols of the cave, due to individual constitutions, education, habit, or accident; the idols of the marketplace, arising out of human intercourse and illustrated by faulty definitions and abuse of words; and the idols of the theater, induced by the received systems of philosophy.) Instead, I will integrate the features of the idolic mind with the distempers in the other writings, and will group them all under three headings, which I take to represent the fundamental, interrelated maladies of the mind as Bacon saw them. The benefit of this reading is twofold: it shows the continuity of Bacon's thought on the topic through time, and, more importantly, it shows that the variegated picture of the distempered mind is rooted in several fundamental flaws that it is important to recognize as organizing both the mechanism of the illness and the prescription of the cure. Bacon's method of inquiry will respond precisely to these fundamental problems.

Self-adoration

The first book of the *Advancement of Learning* includes a list of three "distempers" of learning ("delicate," "contentious," and "fantastical" learning), which is continued with a longer list of what Bacon calls, with Galenic vocabulary, "some other rather peccant humours." Among the latter is the "humour" of an inflated self-assessment or "too great a reverence, and a kind of adoration of the mind and understanding of man."[25] The identification of such self-adoration—also called, with Augustinian echoes, "pride" or "self-pleasing"—as the main obstacle to true knowledge of the world remains constant through Bacon's early and late

writings.[26] He uses this traditionally moral and theological vice to describe man's epistemic situation as anchored in the unsound complexion of the mind.

It is such a "humor" or "affection," Bacon writes, that explains why philosophers disdain mean, vulgar experience and fall in love with speculation and generalities, since it best accounts for the state of a mind in touch only with itself and no longer in touch with things: out of self-adoration, "men have withdrawn themselves too much from the contemplation of nature, and the observations of experience, and have tumbled up and down in their own reason and conceits."[27] It also explains the impatience with sustained research, since the human mind is much more pleased with settling on comfortable opinions than with exerting itself in continuous inquiry: it seeks its own "satisfaction," rather than truth for its own sake.[28] Such "vanity" is involved in the adoption of the early conclusions of natural investigations, or "anticipations," as principles[29] and in the reinforcement of their status as principles by stamping "vain words" on them. The latter is the mark of "delicate learning," such as can be found among the humanists who praise eloquence above all else,[30] and is also the main trouble diagnosed by the idols of the marketplace.

That self-adoration is a particular disposition of the mind is suggested by Bacon's description of the "agitation of wit" such self-insulation breeds, in a manner reminiscent of the "wanderings" of the mind in his moral-religious texts. The "infinite agitation of wit" is the core malady of "contentious learning," exemplified by the disputatious practices of the schoolmen.[31] Pride also goes together with "partiality" and with the tendency to reduce all knowledge to known, familiar measures—the fundamental characteristic of the idols rooted in human nature, which spring from the inclination to see things "according to the measure of the individual [*ex analogia hominis*] and not according to the measure of the universe [*ex analogia universi*]."[32]

The tincture effect

Among the "peccant humours" in the *Advancement* is also the habit of seeing and judging all things through the lens of one's preconceived or beloved notions:

> Men have used to infect their meditations, opinions, and doctrines, with some conceits which they have most admired, or some sciences which they have most applied; and given all things else a tincture according to them utterly untrue and unproper.[33]

Admiration and familiarity cause the mind to become rigidly married to ideas and doctrines that will subsequently "infect" or "tincture" all its cogitations and conclusions. Logic did that for Aristotle, mathematics for Plato, the loadstone for Gilbert. The same phenomenon is captured by the cave idol rooted in the "predominance of the favourite subject" (*ex praedominantia*),[34] as well as by two of the tribe idols: those due to the "preoccupation" of the human spirit (*ex praeoccupatione*), which brings it about that "the first conclusion colours and brings into conformity with itself all that come after" and is often mixed with "delight and vanity"; and those caused by the "narrowness" of the human spirit (*ab angustiis*), whereby the intellect "feigns and supposes all other things to be somehow similar to those things by which it is surrounded." These two categories of "tincturing" distempers are explained in terms of a mental mechanism that involves the intellect's propensity to be "moved and excited" by affirmatives, and, respectively, to be "slow" and thus more easily "moved" by "those things which strike and enter the mind simultaneously and suddenly, and so fill the imagination." This is why it resists consideration of instances that contradict or differ from its first observations and conclusions ("negative" and "heterogeneous" instances).[35] Moreover, if the imagination is critical in this "infecting" phenomenon, so are the affections, as Bacon explains in the tribe category owing to the "infusion of the affections" (*ab infusione affectuum*): the will and the affections "colour and infect the understanding," as can be seen in man's tendency to more easily believe what he had rather were true, which accounts for the rejection of experience and its difficulties out of "impatience," "deference to the opinions of the vulgar," and "arrogance and pride."[36]

Ill-regulated assent

Another "peccant humour" in the *Advancement* is an ill-regulated examination of impressions, or an "impatience of doubt and haste to assertion without due and mature suspension of judgment."[37] Similarly, in the *Novum Organum,* the topic of the "intemperance . . . in giving or withholding assent" is introduced as part of Bacon's treatment of the idols of the theater, but transcends his discussion of the specific schools of philosophy he takes issue with there and takes the form of an attack on two modes of inquiry and assent giving: dogmatism as haste in deciding upon matters without due examination and in imposing them magisterially upon others; and skepticism as a "wandering kind of inquiry" that abstains from deciding at all and instead falls to "pleasant disputation." Bacon suggests that these are members of a type of "intemperance" that

governs all the classes of idols: they seem to "establish idols and in some sort to perpetuate them."[38]

Bacon uses the notion of "assent" in a manner typical of his age, in order to indicate the voluntary acceptation by the mind of the impressions, notions, or doctrines it is presented with. It is thus largely equivalent with the operation of judgment, but the language of "assent" permits a more marked description of the motions of the mind in judgment, and their characterization in terms of their pace (slow or hasty), as well as of the desiderative "motions" from which they are sometimes indistinguishable, and which are also morally assessed.

Ill-regulated assent is indeed the core mechanism of what Bacon takes to be the flawed mode of inquiry into nature that his new method aims to remedy: an inquiry that moves from particulars to general axioms too early and too peremptorily. Not enough investigation of particulars is undertaken, nor is careful ascent through levels of generality pursued. The axioms when established are readily embraced as "settled and immovable," and then the mind proceeds to the discovery of "middle axioms."[39] What Bacon is describing here is the mechanism of syllogistic demonstration, but it is important to note two things. One is that what he describes is not a formal logical procedure but a mechanism of discovery.[40] The other is that he does so in terms of the nature of the movement of the mind's assent. He tells us that in actual fact this irregular, hasty jumping to general axioms is a natural movement of the mind, which "longs [*gestit*] to spring up to positions of higher generality, that it may find rest there [*acquiescat*]; and so after a little while wearies [*fastidit*] of experiment."[41] This is also explained as the intellect's natural propensity to abstractions,[42] to which is added the hasty and irregular (*temere et inaequaliter*) derivation of names from realities, in conformity with the same "faulty and unskilled abstraction" (*mala et imperita abstractione*).[43] Note that this "movement" of an epistemological process is described in passionate terms: the mind "longs" to form general principles in which it may "rest" and is "wearied" of too much inquiry. The description of the idols is equally permeated by passionate and moral terms, as we have seen: cognitive processes are also processes of "satisfaction" or "delight," and these processes are characterized as "slow" or "impatient" and as a product of "vanity" or "arrogance" or "pride."

The same phenomenon is described under the name "anticipation." Anticipations are the first results of reasoning by abstracting from particulars, without enough examination; they are contrasted with "interpretations," the legitimate course of the mind in inquiry. The anticipations, Bacon writes, are far more powerful than the interpretations "for the

winning of assent," since they "straightaway touch the understanding and fill the imagination."[44] This is indeed what happens when the mind is presented with common notions, whose "bands" (*nodis*) "bind" (*astringat*) the understanding,[45] so that it becomes blind to negative or heterogeneous instances, refuses further inquiry into particulars, and rests in preconceived notions and doctrines that "infect" the mind.

Another set of idolic distempers has to do with specific tendencies of judgment formation and their results, which are more evidently related to Bacon's own cosmology and matter theory, but which are also described in terms of particular states or inclinations of the understanding. I group here the tendency to suppose more order and regularity in the world than there actually is, which is due to a sort of inflexible "homogeneity" of the mind (*ex aequalitate*), and the presumption of infinity and final causes, on account of the "unquiet," restless motion of the understanding (*ab inquieto Motu*). Mental dispositions that either cause or result from particular forms of judgment are also involved in the abuse of either comparison or distinction, in conformity with different sorts of minds, and in the abuse of either analysis or composition in judgment upon sense data, resulting either in the distraction or in the overpowering of the understanding.[46]

Impatient and easy assent is also involved in the mechanism of credulity and the blind embracing of authority. A "facility of credit and accepting or admitting things weakly authorised and warranted"[47] is the root of the "fantastical learning" that Bacon identifies as the mark of the Renaissance practitioners of astrology, natural magic, or alchemy. It is also at work in the ungrounded admiration for either novelty or antiquity, which "hurry" the intellect "into assent," and in the unthinking "consent" to authority in the history of philosophy.[48] It is often bred by infelicitous ways of transmitting knowledge: haste in methodizing knowledge and the magisterial way of teaching make it impossible for the mind of the receiver to examine and judge what is being taught, and thus cause it to fall into credulous habits.[49]

In sum, ill-regulated assent, self-adoration, and the tincture effect are the core, interrelated features of the distempered mind. They work in tandem and are best seen as facets of the same mechanism, one that involves a complex mix of cognitive, affective, and moral dispositions. Self-adoration is at work in the establishment of the beloved notions that come to "infect" all of one's judgments, as well as in the intemperate cognitive-desirative movement of assent by which the mind seeks its own "satisfaction" and so springs to generalities and abstractions, without due examination of particulars. Equally, the slowness and rigidity of the

mind are responsible for dogmatism or credulity, which in turn contribute to the tincture effect. A tinctured mind is also prone to rest satisfied with itself and to engage in disputation rather than patient and severe inquiry, which is also one of the effects of the surrender to skepticism.

Bacon's charts of the distempers and idols of the mind are multifarious and difficult to systematize. To recognize this multifarious quality is important in that the charts are meant as a complex practical guide, one that cannot really be methodized into a science but that should be used as a "kind of thoughtful prudence to guard against [the idols]."[50] Yet it is also useful to recognize the core mechanism underlying the multiplicity of distempers, since it is such recognition that can guide the work of the cure: regulating assent, purging the infecting notions and passions, and transcending the self-adoring stance are the major coordinates of Bacon's regimen of the investigation of nature. Self-adoration will be countered by a sustained practice of patient and humble experimental "reading" of the "volume" of God's creatures. The tincture effect will be dissolved by self-reflexive monitoring, as well as by disciplining the mind's attention to instances that flout customary expectations. The mind's haste and restlessness will be cured by a rightful suspension of judgment; its rigidity and slowness by a flexible trial of experimental instances; and its credulity by a course of severe examination of information, and by dynamic ways of transmitting knowledge.

A comprehensive culture of the mind

In dealing with the yet to be perfected practical part of moral philosophy, the culture of the mind, Bacon divides it into an investigative and an operative part. The business of the former is *self-knowledge,* or the discovery of the perturbations and distempers, as well as of the characters and tempers, of men. The latter is an art of *operating* upon the mind, whose fruits are a set of *virtues* of the mind. The articles of the moral operation on the mind form a set of typical humanist moral exercises, which are only briefly listed in the *Advancement of Learning*[51] but discussed in more detail in other writings. Bacon reflects on the usefulness of learning by example and of motivating mechanisms such as praise, reproof, exhortation, and fame; on the benefits of friendship for composing the whole mind, a true medicine for both heart and understanding;[52] on the importance of studies and the various exercises they provide for the various faculties of the mind;[53] and on the efficacy of repeated and varied exercise in changing or building the habits of the mind.[54] In the *Advancement* he insists on the

ability of the exercises to "superinduce" habit and on what he calls an even better kind of culture of the mind: an orientation and strengthening of the will that fixes good habits by "constant resolution."[55] The way Bacon's method of experimental investigation, or his "new logic," is also invested with the role of an operation upon the mind will be the subject of the final section of this chapter. Here I want to show that the other two elements—self-knowledge and the virtues—are similarly construed in Bacon's reformed ethics and in his reformed logic. This will be to reinforce my suggestion that these branches of knowledge are informed by a core doctrine about the tempering of the mind, which may be called a *comprehensive culture of the mind* (illustrated not only in the moral culture but also in the "Arts Intellectual").

The investigation of the distempers is the crucial prerequisite not only of Bacon's practical moral philosophy but also of his new logic, or method of inquiry. As we learn from *Valerius Terminus,* the inquirer's fight against anticipations will be helped by two main guides: first, his resolution and power to "fortify and inclose his mind against all Anticipations," and second, his being "cautioned by the full understanding of the nature of the mind and spirit of man, and therein of the seats and pores and passages both of knowledge and of error."[56] Knowledge of the mind's powers and frailties is one crucial part of the whole renovation of learning. On the one hand, the charts of the mind's distempers have a therapeutic value in themselves: the very investigation of the idols and their causes in the first book of the *Novum Organum* fulfills the role of "expiations and purgings of the mind."[57] On the other, this self-investigating effort is not a distinct, preparative stage preceding the actual pursuit of knowledge. The human mind, Bacon explains in an early text, is not like a waxen tablet of which you need to rub out the old inscription before you can write down the new: "With the mind it is not so; there you cannot rub out the old till you have written in the new."[58] Therefore, the investigation (and the correction) of the tendencies of the distempered mind cannot be a separate, prior activity, but comes with the very application of the mind in its various employments. It comes with the evaluations of situations in practical moral life, with the effort of comprehension in reading, or with the investigation of natural processes in natural philosophy. Awareness of what exactly happens with the tendencies of belief formation in all these situations is one important guide to the effort of regulating them.

The aim of the regulation is a healthy or else virtuous condition of mind. The moral culture of the mind section in both the *Advancement* and the *De Augmentis* ends with a list of virtues that, Bacon makes clear, are to be seen as bridging the moral and the epistemological fields: the

virtues illustrate the "good of the mind, inquired in rational and moral knowledges," which is to say in both ethics and the intellectual arts. It is best understood by analogy with the "good of the body," and thus we will speak of the "health" and "strength" and "beauty" of the mind.[59] The description of these virtues remains constant in Bacon's work, and their first occurrence is in an early text, "Advice to the Earl of Rutland on His Travels" (1595/96). Beauty is the outward expression (the "garment") of the other two inner virtues (the "form of the mind"). Health is another name for the "constancy or even temper and mastery of the passions," and the way to attain it is by self-knowledge (observing your "diseases") and by applying the medicine of reason.[60] Strength is the active power of the mind, and its subordinate virtues are liberality/magnificence and fortitude/magnanimity. In his postscript to "Advice," Bacon makes it clear that, the way he understands them, health and strength are not the same virtue: "the one [health or constancy] binds the mind in and confines it, the other [strength or active power] raises and enlarges it."[61]

The active strength of the mind is especially important to Bacon. It features in the discussion of the doctrine of the good in the *Advancement of Learning,* where his open purpose is to defend, in humanist fashion, the public against the private good and the active against the contemplative life. But his terms are also suggestive of his conception of the nature of and the best regimen for the mind. Not only is the *vita activa,* devoted to the public good, the correct form of life, but it goes together with an inner *vita activa,* or an active life *of the mind,* which translates as a constant trying of the mind's powers by confronting it with its own distempers. The aim is not the complete extinguishing of the perturbations of the mind. Rather, again by analogy with the body, "as that health of body is best which is ablest to endure all alterations and extremities, so likewise that health of mind is most proper which can go through the greatest temptations and perturbations."[62] Moral philosophers have sought the harmony of the mind by equalizing its temper and ridding it of disturbances. But this is to make minds "too uniform" instead of "breaking them sufficiently to contrary motions."[63] The training of the mind should strike the right balance between the two chief inner virtues: constancy should not be sought at the expense of the cultivation of strength, or active power.

If we look at the doctrine of the idols through the lens of this Baconian definition of the health and strength of the mind, the reading of his course of inquiry into nature as a variant of the art of tempering the mind will be in fact reinforced, rather than weakened, by Bacon's statement that the idols, especially those of the tribe, cave, and marketplace,

cannot de eradicated, and that all we can do is become aware of them.[64] Fighting the idols can never be a complete success story: they will accompany man's journey through this life to the very end. But it is precisely the continuous, exerting fight with the idol-producing distempers that is in fact the best route toward building the active power of the mind. Indeed, Bacon refers to the same virtues as they obtain in the rightful pursuit of natural knowledge. In *Valerius Terminus,* he presents the true "interpretation of nature" as a fight against idols, corrupt affections, and anticipations. To keep them at bay requires "resolution and strength of mind"; but even if the inquirer manages to resist them in the first round, so to speak, they will reappear in the next stages of the investigation, and to keep resisting them he needs to redouble his "strength and patience of mind."[65] Similarly, the fable of "Prometheus, or the Nature of Man" in his *De Sapientia Veterum* (1609) is decoded in such a way as to highlight the same virtues in the context of the pursuit of knowledge: Prometheus receives Hercules' help, i.e., he receives the virtues of "fortitude and constancy of mind"—which are brought by the Sun, i.e., they come "of Wisdom."[66]

If, then, the main Baconian virtues of the mind—constancy and strength—cross the divide between logic and ethics, we may ask whether Bacon provided explicit support for such a unification of the virtues. I believe the answer lies in his distinction between moral and civil philosophy: while the latter looks to "external goodness," which is expressed in social deportment ("conversation"), public counseling and negotiations, and government by laws, the former looks to "internal goodness."[67] A similar distinction is between virtue and duty: the latter refers to "the mind well framed and disposed towards others," the former to "the mind well formed and composed in itself."[68] The two—the outward-looking and the inward-looking aspects of the goodness or the good disposition of the mind—are interlaced, yet Bacon also wants to distinguish between these domains. There is thus a realm of the philosophy of man whose aim is the reformation of his *mind* as distinct from (although not unrelated to) the reformation of his *manners* and public deportment. There is a social ethics attached to the reformation of learning, which issues in "society and peace," but there is also an individual ethics, concerned with remedies for the diseases of the mind.[69] Bacon calls the latter moral philosophy and takes its domain to be the "internal goodness" of the mind. Even though in the division of the faculties he says that moral philosophy deals mainly with the will and the affections, in fact he extends its domain to the "Arts Intellectual," which deal with the understanding, and thus signals his preoccupation with the fundamental discipline (an

art of tempering the mind, or a comprehensive culture of the mind) that looks to the good of the *entire* mind. It follows that the Baconian virtues described above are indeed virtues *of the mind,* describing its states, dispositions, or activities, be it in the domain of practical moral life or in that of natural philosophical inquiry.

In the first book of the *Advancement of Learning,* Bacon speaks in a similar vein of the innumerable "remedies which learning doth minister to all the diseases of the mind," which he explains by means of a medical analogy: "sometimes purging the ill-humours, sometimes opening the obstructions, sometimes helping digestion, sometimes increasing appetite, sometimes healing the wounds and exulcerations thereof, and the like."[70] Learning can act as such a medicine for the mind primarily because it makes possible the exercise of reason: it teaches the mind to take the right measure of things and evaluate them from the right perspective,[71] and it teaches the discipline of examination:

> It taketh away all levity, temerity, and insolency, by copious suggestion of all doubts and difficulties, and acquainting the mind to balance reasons on both sides, and to turn back the first offers and conceits of the mind, and to accept of nothing but examined and tried.[72]

Bacon says that what he explains thus is the way learning is conducive to moral virtue. But moral virtue, we have seen, stands for the inner good of the mind, so that Bacon's notion of moral virtue in fact covers the classical moral and intellectual branches of the virtues. Indeed, the discipline of examination described above is a variant of his requirement about the rightful investigation of nature, that the mind should resist anticipations as definitive and examine and evaluate the impressions and notions suggested to it at every stage in the course of inquiry—precisely the substance of his natural philosophical logic, or method. Before looking at the latter, a discussion of the Baconian theme of the "end of knowledge" will be apt to reinforce the regimen reading of his method, while also throwing light on the question of the "utilitarianism" of the new philosophy.

The end of knowledge

One of the earliest definitions of the end of knowledge is in Bacon's "Advice to Rutland." There, this end lies in the acquisition of the virtues of the mind ("clearness and strength of judgment") for their own sake, rather than for ostentation or praise. Bacon adds that this holds true for

the whole set of virtues, intellectual or moral, "of knowledge" or "of prudence."[73] In another early text, "In Praise of Knowledge," the role of knowledge is again described as a cure that can "clear the mind of all perturbation."[74] What is added there is the idea that knowledge is also what can ensure the "sovereignty of man." This sovereignty is expressed in man's command over nature "in action," which can come about only if man learns how to be "led by her in invention."[75] This latter clarification puts an important gloss on the more familiar idea of a Baconian advocacy of scientific control over nature. To control nature, for Bacon, is to serve as her minister. It is to be able to operate on the underlying order of nature, and the only true and thus legitimate form of operation is one that obeys the ways in which nature herself operates. In the texts accompanying the *Novum Organum* in the 1620 edition, Bacon insists that true command over nature comes with a capacity of waiting upon her and of acting as her servant and interpreter.[76] Such true command, moreover, is one that is pursued with the right motivation. In several places Bacon repeats the idea that, as he puts it in the preface to the *Instauratio Magna,* the true ends of knowledge are "the benefit and use of life, and that they perfect and govern it in charity."[77]

Baconian "utility" bears little resemblance to modern (nineteenth-century) utilitarianism. Brian Vickers has convincingly challenged this association and shown that the correct context for Bacon's notion of public benefit is the mixed tradition of the philosophical *vita activa* and of Christian *charity* and *philanthropy*—a tradition well established in humanist culture, which Bacon transferred to the domain of natural philosophical knowledge.[78] Utility as a form of charity bears the full weight of the social ethics that Bacon attached to his vision of the end of knowledge. I would like to add here that utility thus understood is naturally aligned with his conception of the regimen of the mind provided by the rightful pursuit of knowledge, and thus that the social ethics is inextricably linked with the Baconian individual ethics, which looks to the (internal) good of the mind. In the *Advancement of Learning,* Bacon highlights charity as the best culture of the mind, crowning the moral-philosophical and religious exercises of the "operation upon the mind." It alone is capable, he says, of forming the mind into the whole set of virtues at once.[79] The two dimensions of charity—philanthropy and the culture of the mind—are mutually reinforcing, and they are grounded in a theological conception of human nature.

The theological story is as follows: Man's Fall was occasioned by his proud attempt to acquire by himself moral knowledge of good and evil. It was thus not knowledge of nature (or of the creatures) that brought

about his defection. Rather, natural knowledge remains a legitimate form of knowledge after the Fall, and man remains both capable of and geared toward such knowledge by divine decree: the mind of man is like "a glass capable of the image of the universal world," and the thirst for the knowledge of the world is "an instinct from God" (not "an humour of the mind").[80] The capacity and the propensity are in themselves divinely sanctioned, but in order for man's pursuit of this knowledge to acquire its full legitimacy, they need to be complemented by the right motivation and the right course of action. The right motivation is that of imitating God's goodness, which means that knowledge should be used in charity, "for the benefit and relief" of man. The right course of action is one that is able to "open and dilate the powers of his understanding as he may."[81] The latter is a capacity ("as he may"), and thus the reformation of the postlapsarian human mind is possible through human effort. In his early *Confession of Faith,* written sometime before 1602, Bacon wrote that the Fall brought about a corruption (in the sense of a privation) of nature, as well as a "defacing" of the image of God in man. But nature still preserves the laws of creation "inviolably," which operate at the level of secondary causes, and man's role is to follow, contemplate, and imitate the divine wisdom expressed in creation. At the same time, while man's restoration is to be the work of the Holy Spirit, that work may take the form of an "immediate call" through grace but may also be "ordinarily dispensed" by means of a variety of human activities, among which is the "contemplation of [God's] creatures."[82] On the other hand, if the "opening" of the understanding does lie in human power, it is also a particularly difficult task. The mind may be capable of the image of the world, but it is also ordinarily a distempered organ, a "false mirror," as Bacon puts it in the *Novum Organum,* which "distorts and discolours the nature of things by mingling its own nature with it."[83] Moreover, the natural world is not a neat or open image: it is "framed like a labyrinth"[84] and exhibits a "subtlety" for which the ordinary faculties of man are hardly a match.[85]

The increase of the powers of the mind is one fruit of the planned interpretation of nature that Bacon sketched for his Great Instauration: his method of natural histories and induction is aimed at an "opening of the ways of sense and the increase of natural light"[86] and at offering "true helps of the understanding: that thereby (as far as the condition of humanity and mortality allows) the intellect may be raised and exalted, and made capable of overcoming the difficulties and obscurities of nature."[87] In "In Praise of Knowledge," Bacon said that the mismanagement of learning in the past ages had prevented the "happy match between the mind of man and the nature of things."[88] In a much grander tone, Bacon

will say the same thing in his *Instauratio Magna,* where the "expurgation of the intellect" that his new logic brings is said to be "the strewing and decoration of the bridal chamber of the Mind and the Universe, the Divine Goodness assisting."[89] The restoration of human sovereignty is a restoration of the powers of the understanding that Adam enjoyed and that granted him rightful command over the creatures.[90] Such restoration is achieved by the marriage of mind and world, which is the task and the supreme good of man. The "commerce between the mind of man and the nature of things" is "more precious than anything on earth."[91] Bacon's interpretation of nature promises exactly this: "for I am building in the human understanding a true model of the world, such as it is in fact." This marriage is such that its fruits are at the same time knowledge or truth (*light*), and power or operation conducive to utility and works (*fruit*).[92] But if this is the grand ideal task of man's pursuit of knowledge in this life, the more immediate focus will need to be on the path commanded by this horizon, which requires great labor on the part of man, a labor that is in no small measure a work upon his own mind.[93] Clearing the mind of its distempers is a task that can be pursued by practicing the experimental reading of the "volumes of [God's] creatures." This practice, Bacon suggests, is enabled by the cultivation of the right motivation—charity or service to the common good—and by a right disposition of the heart that he calls "an humility of mind."[94]

In sum, Bacon's discussions of the end of knowledge bring together the theme of work for public benefit and that of work on the human mind. Charity is expressed, in good Christian and humanist fashion, by provisions for the relief of mankind. But charity is also, again in true Christian spirit, a disposition of the heart and the vinculum of the culture of the mind (cf. the description of charity as the "bond of perfectness" in Colossians 3:14, quoted by Bacon). If charity is a social virtue associated with the Baconian pursuit of useful knowledge, it is also an individual virtue—a virtue of the mind (the chief one) and the bond of the mind's internal goodness.

Mistaking or misplacing the true end of knowledge, Bacon says in the *Advancement of Learning,* has been the chief "peccant humour" of human learning. Knowledge is pursued for all kinds of wrong reasons: out of curiosity, for the sake of delight, reputation, or fame, or simply as a lucrative profession. But the question of wrong reasons is readily translated into a question of the motions of a distempered mind: illegitimate motivation is the fruit of a "restless spirit," a "wandering and variable mind," and a "proud mind." Conversely, 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.[95]

The study of nature as regimen

A perambulation of the world

The theological story explored above grounds Bacon's conception of the experimental study of nature as a regimen for the mind. Although the mind of man is ideally capable of the image of the world, it is nevertheless, in its current state, a mirror distorted by distempers. Chief among them is pride or self-adoration. Pride is a morally vicious state but also a "humor" of the mind, one that is expressed in distorted motions, haste, and laziness, driven by an inclination of desire. The mind seeks its own delight and satisfaction, and that is why it mismanages its operation of assent, it is credulous, and it is easily infected with poorly examined opinions in which it rests with dogmatic assurance. The truths about nature it settles on are thus often the result of such a flawed cognitive-cum-affective process guided by the pursuit of satisfaction. Even those who seek knowledge for itself rather than for benefit, ostentation, or narrow practical results, Bacon tells us in *Valerius Terminus,* still err in their pursuits and miss the true end of knowledge because their minds seek "satisfaction (which man call truth)": "It is much easier to find out such causes as will satisfy the mind of man and quiet objections, than such causes as will direct him and give him light to new experiments and inventions."[96] The doctrine of the idols in the *Novum Organum,* written seventeen years after *Valerius Terminus,* can be seen as an extended explanation of this mechanism of the mind's propensity to self-satisfaction. Equally, Bacon's method for the interpretation of nature developed in the *Novum Organum,* the *De Augmentis Scientiarum*, and the writings on natural history in the 1620s is a development of the core thesis announced in *Valerius Terminus*: the thesis that, given the state of the world and the state of man's mind, the true end of knowledge, in its "best and perfectest condition," lies "in the nature of the direction" which can "guide [men's] travels."[97] The "direction" should be capable of disclosing the secrets of nature, while also purging the humors of the mind.

There are two major dimensions to the Baconian "direction" that argue for its rooting in a program for the cure and training of the mind. One is the fundamental rationale for the experimental nature of the legitimate inquiry into nature, which Bacon constructs in opposition to

the speculative way of inquiry. The other has to do with the major features of his method, which specify not only the best route toward true knowledge of the world but also the course of a discipline for the mind's powers. Both respond to the major features of the idolic mind. They also form part of the Baconian legacy of later seventeenth-century English experimental philosophy. While in Bacon's case they are to a large extent bound up with his pneumatic theory of matter, which was superseded in the course of the century by the new mechanical philosophy, the features of the experimental program I will insist on here took on a life of their own and profoundly shaped the later virtuosi's thought.[98] Their Baconian legacy, I propose, includes not only the experimental methodology of natural investigations but also the notion of a comprehensive culture of the mind associated with it.

Bacon introduces a critique of speculation at the end of his account of the end of knowledge in the *Advancement of Learning*. He writes that, unlike Socrates, he is equally interested in both moral and natural philosophy and adds: "But as both heaven and earth do conspire and contribute to the use and benefit of man; so the end ought to be, from both philosophies to separate and reject vain speculations, and whatsoever is empty and void, and to preserve and augment whatsoever is solid and fruitful."[99] The "vain speculations" of which both moral and natural philosophy need to be purged in order to become "solid and fruitful" are associated with the idols of the mind in a number of early texts. Contemplative philosophy turns "away from things" and rests on "our own blind and confused idols" or the "monstrous idols of the great speculative thinkers."[100] Those who have "given up Natural History in the sense of a perambulation of the world" have fallen prey to the "doctrine that truth is the native inhabitant of the human mind, not something that comes into it from outside"—which is not simply a doctrine but an "alienation of the mind" and an "agitation of their own wit" that comes under the "high-sounding name of contemplation."[101] The "withdrawing and abstracting it [the mind] from particulars" is a sign of sloth and self-flattery, due to the "adoration" of the deceiving mirror of the mind.[102]

The noteworthy thing that Bacon does here is to discuss "speculation" (or theoretical knowledge divorced from experimental investigation) as a fruit of the distempered mind—of its "agitation, "alienation," "sloth," "pride," and "self-adoration." The emptiness of speculation covers for Bacon both the sense of being barren of "works" (which are the test of truth as well as beneficial to the public) and that of being unfruitful for the rectification of the mind. Speculation rests on (and reinforces) the perturbed mind. At the bottom of this view lies a cluster of interrelated

themes. One is Bacon's view about the sources of knowledge. Nature is the creation of God and it alone bears his footsteps, or laws. These laws cannot be found in the mind alone, through speculative constructions. Knowledge about the natural world therefore is to be acquired by the experimental reading of the volumes of God's works. This requirement points to a second theme: a specific understanding of experience, as summoned not in order to illustrate a speculative theory but rather to build and correct theoretical constructions.[103] As Bacon puts it, Aristotle also used observations of particulars, but they came "after his mind was made up": Aristotelian experience was "captive and bound."[104] Baconian experience, in contrast, while not unrelated to theoretical constructions, is not bound to (and fit only to illustrate) some previously established dogma. The new notion of experience and the view of the legitimate source of natural knowledge go together in Bacon's thought, and they are reinforced by a third theme, which places a moral load on the correct or flawed use of the sources of knowledge. Not only is speculation an unfruitful route to knowledge about the natural world, but, as we have seen, it is associated with the flawed functioning of a mind distempered in its cognitive as well as affective and moral condition. The three themes combined form the backbone of Bacon's discussion of the major schools of philosophy and their errors in the *Novum Organum,* under the idols of the theater. The "Rational School" (Aristotle) build dogmas on too few, common, "captive," and poorly examined particulars, leaving most of the work to the "agitation of wit"; the "Superstitious School" (Plato, Pythagoras) build systems of the world based not on the information of nature but on that of theology, and are thus at the mercy of their ensnaring imagination, vanity, and ambition; even the "Empirical School" (the alchemists, Gilbert), while engaging with experiments in a better manner, still neglect to erect a comprehensive natural history and hasten to construct systems of philosophy out of a handful of observations, which they allow to "infect" their imagination, and thus cannot control the hurried leap of their understanding to universals and principles.[105] Similarly, in the preface to his collection of natural histories of 1622, the *Historia Naturalis et Experimentalis,* Bacon writes that consulting the mind alone to the end of understanding nature results only in vain philosophies and dogmas, figments of the imagination, and "invented systems of the universe,"[106] which will be colored by the mind's distempers. The right route toward discovering natural truths—i.e., toward the "marriage" of mind and world—is one that can keep the mind close to the details of nature, through a natural historical and experimental "perambulation

of the world." The key point here, which Bacon announces in *Valerius Terminus* and develops in his later writings, is that continued and informative contact with nature is a practice that cultivates patience and humility, and is thus a privileged means of blocking self-adoration and of regulating the mind's operations.

It is in this context that we should read Bacon's remarks that his method will leave little to the "strength and excellence of the wit," that it will "equalize" all wits, and that "the human intellect left to its own course is not to be trusted."[107] These remarks may seem to encourage a reading that has Bacon uphold the need to secure a procedural method at the expense of personal virtuous dispositions. But I suggest a different reading. The context of such statements is precisely the critique of speculation or "abstract meditation" and the defense of the method of experience. For instance, in the preface to the *Instauratio Magna,* Bacon inveighs against the builders of theoretical systems, who proceed "as if invention were nothing more than an exercise of thought, to invoke their own spirits to give them oracles."[108] To allow the mind to work by itself when it comes to discovering truths about nature is to mistake the right kind of exercise for the mind in this particular area of knowledge. Without the help of natural histories and of inductive reasoning, the mind falls into an insulated "agitation," indulges in its corrupt tendency of jumping to generalities, and becomes entangled in its own contrivances. But if applied constantly to the observation of nature, armed with an awareness of its own distempers, with the motivation bred by an understanding of the theologically sanctioned end of knowledge, and with the instruments of Bacon's directions, the mind engages in a course of training that can indeed build its virtues. Natural strength of wit is useless when not applied to experience precisely because of its (proud) speculative tendency; it will therefore need to be "hung" with the "weights" of the directions.[109] These directions form a "machinery" whose role is to guide the mind in a legitimate way, which is also one that alone can recover its "sound and healthy condition."[110] The "machine" image, therefore, does not point to a modern notion of impersonal method, but is rather, in Bacon's usage, perfectly coherent with the context in which it features, of the introduction to a method that promises not mechanical "objectivity" but "a more perfect use and application of the human mind and intellect" (*melior et perfectior mentis et intellectus humani usus et adoperatio introducatur*) and a "better and more perfect use of human reason in the inquisition of things," whereby "the intellect [and the faculties] may be raised and exalted" (*exaltetur intellectus et facultate amplificetur*).[111]

The Art of Direction

The "machinery" of Bacon's method is indeed devised in such a way as to minister to the human faculties and to take care of the mind's distempers. If the general rationale for the experimental study of nature responds, as we have seen, to the core defective condition of the human being (pride or self-adoration, coupled with the speculative tendency of the mind), the features of the method form an equally curative regimen.

Natural investigations should begin from the particulars of experience, rather than from a preestablished theoretical system or dogma. The key contrast here, we should note, is indeed with dogma (which carries all the connotations of "speculation"), but not with the use of reason and theoretical conclusions in experimentation. Always fond of eloquent images, Bacon compares the "true business of philosophy" with the work of the bee, which, unlike both the empirical ant and the dogmatic spider, combines collection of particulars with their digestion, the empirical faculty with the rational faculty.[112] Experience should not be "captive," a servant to some previously established theoretical system; but this does not mean that theorizing is completely absent from the philosophical work on experience. Indeed, the operation of judgment plays a crucial role at all the stages of the inquiry, from the observation, collection, and arrangement of particulars, to the organization and elimination of instances, up to the higher levels of interpretation. In a passage in the *De Augmentis,* Bacon claims that the operations of all the faculties are in fact variants of a master power of the mind, the *vis cogitativa*.[113] In this sense, well-directed inquiry rests on a discipline of observation and judgment, and Bacon makes the point explicitly. The art of inquiry, which in the *De Augmentis* is rebaptized the art of direction, and the art of examination or judgment are one as far as Bacon's new logic, a logic in the service of natural inquiry, is concerned:

> For here the same action of the mind which discovers the thing in question judges it; and the operation is not performed by help of any middle term, but directly, almost in the same manner as by the sense. For the sense in its primary objects at once apprehends the appearance of the object, and consents to the truth thereof.[114]

The art of direction should manage to steer its course between the extremes of naked empiricism and self-involved speculation, and between those of radical skepticism and dogmatism. In framing this art, we can learn something from the skeptics, whose criticism of dogmatic philoso-

phies is a wise refutation of hasty theory building. But the skeptics also erred when they blamed the senses and concluded that knowledge could not be had at all. The senses in themselves are not actually too much to blame; what is at stake is rather the defect of the mind and the poor methods of reasoning upon sense perceptions. The task of the art of direction is therefore "to provide the intellect with proper helps for overcoming the difficulties and obscurities of nature," so it can become "a match for the nature of things." Its two parts are learned experience, which teaches methods of experimentation, and the interpretation of nature or the new organon, which teaches the method of induction.[115]

The foundation of this art lies in *natural and experimental history*. Such a history should contain "material true and copious and aptly digested for the work of the Interpreter which follows."[116] The natural history Bacon has in mind is one aimed not at collecting particulars for their own sake but at gathering and organizing the foundational basis of philosophy.[117] This history is "of a new kind," Bacon explains, in that it covers three areas of things, in conformity with the three "different states" of nature: "generations" (or nature in its ordinary course), "pretergenerations" (or nature driven out of its ordinary course, as in the case of monsters), and "arts" (nature put under constraint or molded by art). The latter is the object of "Mechanical and Experimental History" and is "of all others, the most radical and fundamental towards natural philosophy." The reason is that nature, like Proteus, is mostly apt to reveal its underlying shapes if constrained and "vexed" by art.[118] Toward the end of his life, Bacon became ever more insistent on the crucial role of well-organized natural histories and produced several of his own (histories of winds, of life and death, of dense and rare, and the *Sylva Sylvarum,* bound with *The New Atlantis* in 1627).[119] He took the scope of these histories to be the whole range of natural things, from observable natural phenomena to unobservable "desires" of matter, from trades and machines to the faculties and passions of man. These collections of observational and experimental data were supposed not to include but to prepare the inquiry into causes (which was the task of the interpretation of nature). To that end, they could not be mere enumerations of undigested facts, but included tools for the further organization of research: questions "in order to provoke and stimulate further inquiry," explanations of the manner of experimentation employed, notes on the epistemic status of findings (in the case of doubtful facts or reports), observations on the facts, as well as reviews of received opinions on the matter under scrutiny.[120] Bacon employed such tools in his own natural histories, to which he added tentative causal speculations and provisional theses about the nature of matter.[121]

A Baconian natural history includes elements of what, in his tree of knowledge, he classified as the distinct art of *learned experience*. The latter, he writes, is "a kind of sagacity," in the form of a "hunt."[122] It includes a complex array of methods of experimentation (e.g., variation, repetition, extension, transfer, coupling, or even random application of experiments), to which is added a topical exercise of devising the right questions to ask in the course of investigation. This procedure results in tables of queries, or "Articles of Inquiry," to be used in the actual course of experimentation.[123] Methods of experimentation and lists of queries, we have seen, were in fact designed as parts of the natural history itself. Moreover, their role is to jointly act on both matter and mind, which Bacon expresses by means of the same dynamic metaphor: experiment (especially the random type) "shakes out the folds of nature" (*sinus naturae excutit*), while the wise framing of queries "will help us to shake out the folds of the intellect within us" (*ad intellectus nostri sinus intra nos excutiendos*).[124] Another variant of the natural historical collection of facts is represented by the *tables of discovery,* or the methodical arrangement of "instances" that testify to the presence, absence, or degrees of specific natures, which issues in a process of elimination.[125] In all these procedures, the faculty of judgment is the key operator: it guides the arrangement, assessment, and elimination of facts, it asks relevant questions for further inquiry, and it formulates provisional conclusions that themselves have the role of directing further research. If natural history and learned experience are credited with the role of ministering to the senses and to memory, they are also members of a discipline of judgment.[126]

One important element in this discipline is the practice, which this format of investigation requires, of the acceptance of the provisional nature of results and the guidance of further research. The key virtue of learned experience is the ability to ask questions, not to give answers, and when answers are gleaned, they need to be held as temporary and the search continued. Of the same nature is the stage in the interpretation of nature that Bacon calls "the *First Vintage*": after the tabulation of experience, the understanding is allowed to form provisional definitions of the nature under investigation, on condition that what is found is considered only as provisional, of a low degree of certainty, and as directive for the continuation of investigation.[127] Similarly, Bacon's own speculative theories, designed as the fifth part of his Great Instauration, need to be held only provisionally, without "binding" oneself to them.[128] The end point of the Baconian interpretation of nature is the complete certainty of the discovery of forms, or laws of nature, but the core requirement of

his method is that certainty not be embraced too soon: the complex process of grappling with the subtleties of nature is to go through the patient accumulation of particulars by means of well-directed inquiry, through lower, progressive levels of certainty,[129] and through a sustained exercise of suspending (definitive) judgment. The latter, Bacon explains, is not a form of skeptical *acatalepsia,* but a *eucatalepsia,* which does not deny the capacity to understand but provides true helps for the government of the understanding.[130] Inquiry should not be stopped before its natural end, but this is exactly what the human mind left to itself seeks, to leap to a position of certainty in order to satisfy its vanity and desire to rest. Bacon's instruments are designed to counter this intemperance, to slow down the mind's restlessness and guide it along a regular path.

Bacon's persistent thought seems to be that the great enemy of the human mind, which the mind itself seeks, is stagnation. There is stagnation due to its hurried quest for the comfort of certainties, and there is also stagnation due to its rigid enjoyment of familiar truths. Against the latter, Bacon prescribes a battery of practices for shedding inflexibility, including the variation of experiment, the eliminative tabulation, the balancing of composition and analysis, and of comparison and distinction, or the guiding of observation beyond common notions toward negative and heterogeneous instances. Similar procedures feature in the set of "*Prerogative Instances*," which, in the scheme of the *Novum Organum,* constitute the first step of induction proper (a first step in a series of eight, which Bacon never actually detailed). The prerogative instances have a superior status compared with that of the common instances of the tables of discovery, in that they bring special information to bear on the nature under investigation. Their role is to assist both the senses and the understanding.[131] One especially relevant example is the description of the help to the understanding provided by a series of five types of instances (Instances Conformable, Singular, Deviating, Bordering, and of Power): they are to be collected in a history as soon as possible, since "they serve to digest the matters that enter the understanding, and to correct the ill complexion of the understanding itself, which cannot but be tinged and infected, and at length perverted and distorted, by daily and habitual impressions." These are instances that in various ways contradict customary representations of things, so that the mind needs to learn how to observe them, and how to revisit its former conclusions, in yet another stage of a discipline of observation and judgment. It will thus be able to counter its rigidity and slowness, its credulous and self-tincturing tendencies, and thus engage in "a sort of preparative for setting right and purging the understanding."[132]

We can see thus how Bacon's methodological prescriptions for natural experimental inquiry are also assigned the function of a regimen for the human faculties so that they parallel the exercises in his moral culture of the mind. For Bacon the legitimate study of nature has a practical quality not only in the sense that knowledge is at the same time power, that is, that discovery of natural processes is at the same time an operation upon them, but also in the sense that the experimental method provides a procedure for operating upon the mind of the inquirer. I have defended the view that this is an internal operation, conducive to internal goodness, rather than an external regimen, indifferent to the strength and health of the mind.

There is also another type of remark Bacon makes in several places that is significant in this sense. Although the mind has a natural intemperate tendency of jumping to generalizations without enough informative and flexible examination of particulars, it is also the case that the right progress of the mind from sufficient and well-digested particulars on to axioms of ascending degrees of generality, themselves further guiding the discovery of particulars, is itself a natural movement of the mind: "the mind of herself by nature doth manage and act an induction much better than they [the logicians] describe it."[133] Bacon seems to work with two senses of "natural," distinguished by the distempered-healthy dichotomy: the mind is naturally distempered, but it also has the capacity of falling back into an equally natural healthy functioning. This capacity needs indeed to be helped by art. But for Bacon the art-nature distinction was tenuous,[134] and he could easily play with the two terms, as when, in the *Novum Organum,* he tells us that his art of interpreting nature is not "absolutely necessary" since, once armed with a "just history of nature and experience," and with the rules of the discipline of judgment (to resist infection by unexamined opinions, and to avoid hasty generalization), men "would be able by the native and genuine force of the mind, without any other art, to fall into my form of interpretation. For interpretation is the true and natural work of the mind when freed from impediments."[135] So interpretation would be natural to a mind freed from impediments. But the freeing from impediments is precisely the task of Bacon's art, and in fact the conditions for a natural interpretation sketched above are precisely its core guidelines. In other words, nature does not need art if it is armed with the tools of art. The apparent contradiction dissolves, though, if we consider the two senses of "natural," and the suggested equivalence between art and improved nature. Significantly, therefore, Bacon envisages his "art" as connatural to a fortified mind, rather than seeing it as an "external" methodology that dispenses both with the weaknesses and the strengths of the person.

I have argued that Bacon's method not only has the role of a scientific methodology but is also construed as a discipline of observation and of judgment. It is also, I want to add, a discipline of the emotions: it operates not only on the inquirer's epistemic processes but also on his affects and moral disposition, which it is expected to be able to orient in a legitimate direction. The mastery of passions, desires, and vanity, which is interrelated with the mastery of epistemic intemperance, is accomplished not by means of an extinction of the emotional dimension of the human mind, but by the cultivation of the humility and charity, the love of truth and the desire for the purification of one's mind that alone, Bacon says, can guide a legitimate study of nature.[136] The Baconian study of nature by "direction" is involved in the complex cognitive, affective, and moral life of the mind.

The sons of science

Thus framed, this course of study truly involves the person of the inquirer, rather than erasing the person for the sake of the establishment of the authority of method. The idea of committing oneself to legitimate inquiry in the sense of a personal trial is suggested in two passages in which Bacon casts himself, and then his reader, in the role of the heroic inquirer:

> For my own part at least, in obedience to the everlasting love of truth, I have committed myself to the uncertainties and difficulties and solitudes of the ways and, relying on the divine assistance, have upheld my mind both against the shocks and embattled ranks of opinion, and against my own private and inward hesitations and scruples, and against the fogs and clouds of nature, and the phantoms flitting about on every side.[137]

Bacon reflects his self-portrait back on the reader and invites him to a similar course of self-trial: "let him make some little trial for himself of the way which I describe and lay out; . . . and when all this is done and he has begun to be his own master, let him (if he will) use his own judgment."[138]

The return to self-mastery is a recurrent theme in Bacon's early writings, framed as addresses to the "sons of science": Bacon's plan is to gain adepts for his vision of the reformation of learning, and thus to be able to "restore [them] to [them]selves."[139] Bacon's reflections on the communal nature of the experimental activity are mainly devoted not to questions about the collective gathering, establishment, or interpretation of facts,

but rather to the transmission (or "tradition") of knowledge. The theme of self-mastery, and thus the comprehensive concern with the culture of the mind, is present in these reflections as well. The "errors of tradition," or the "misplaced succession of wits," is one of the major faults of previous learning.[140] Bacon's key concern in this respect is with the vitality and fruitfulness of transmitted knowledge. His discussion of methods of transmission inveighs against solidified bodies of knowledge (or "systems") imposed magisterially on credulous disciples and praises instead the efficiency of "initiative" methods, which display to the student the mechanism of the way to knowledge, rather than its settled results. He is especially in favor of the method of communicating knowledge by means of aphorisms, which are apt to invite reflection and contribution on the part of the receiver.[141] His own *Novum Organum,* of course, is constructed as a series of aphorisms. In his early texts, he represents the same ideal by means of images of organic growth: his new method is based on a "vital principle," so that the "tradition of the sciences may mature and spread like some lively vigorous vine." The fruitful succession of "wits" is such that they can "mingle," and thus the sciences will grow, like "living waters," by the combined efforts of many men. The good example in this case is provided by the practitioners of the mechanical arts. The contrast is with the (speculative) philosophers, whose work cannot invite further growth but is rather raised so that another's may be destroyed. Their sciences are therefore like "statues of the gods," which "are thronged with worshippers, but never move."[142]

The theme of the fruitfulness of the transmission of knowledge does not involve facile democracy. The true sons of science need to prove they are worthy to be selected into its "family." Such early thoughts are woven again, toward the end of Bacon's life, in the fabric of his *New Atlantis* (1627). Its mysteries are not easily decoded, but there is surely an air of initiation surrounding the whole story.[143] There is also the symbol-ridden episode of the "Feast of the Family," which is constructed around images of organic growth (a ritual of the *vine* is at its center). The world of Bensalem is possibly an emblem of the human virtues: they are civic virtues,[144] but also moral virtues, in Bacon's comprehensive sense of the term, as well as virtues of wise tradition. They could all be pictured in the same story since for Bacon they were all in fact intertwined, and they all embodied a "vital principle." Tellingly, in the *Advancement of Learning,* Bacon tells us that the culture of the mind is the vital part of his moral philosophy: without it, the doctrine of the good remains "a fair image or *statua*, which is beautiful to contemplate, but is without life and motion" (emphasis mine).[145]

The growth of knowledge and the growth of the mind are interrelated aspects of Bacon's program for the reformation of learning. Both are alternatives to stagnation, be it the stagnation of theoretical systems or that of self-satisfied minds. But it is not quantitative growth that Bacon has in mind, or an accumulation of knowledge results delivered by researchers abiding by routinized procedures. His organic metaphors, set in contrast with an image of statuesque rigidity, point to an inner, qualitative growth, which for him represented the "inner goodness" of man. I have argued that Bacon's natural philosophical project, no less than his moral philosophy, includes a core (vital) practical dimension, which is tributary to his concern with the education of the mind's powers. But this concern was not singular, and the terms in which Bacon formulated it were in tune with similar preoccupations in the European cultural space around him. I turn now to an investigation of this early modern culture of regimens.