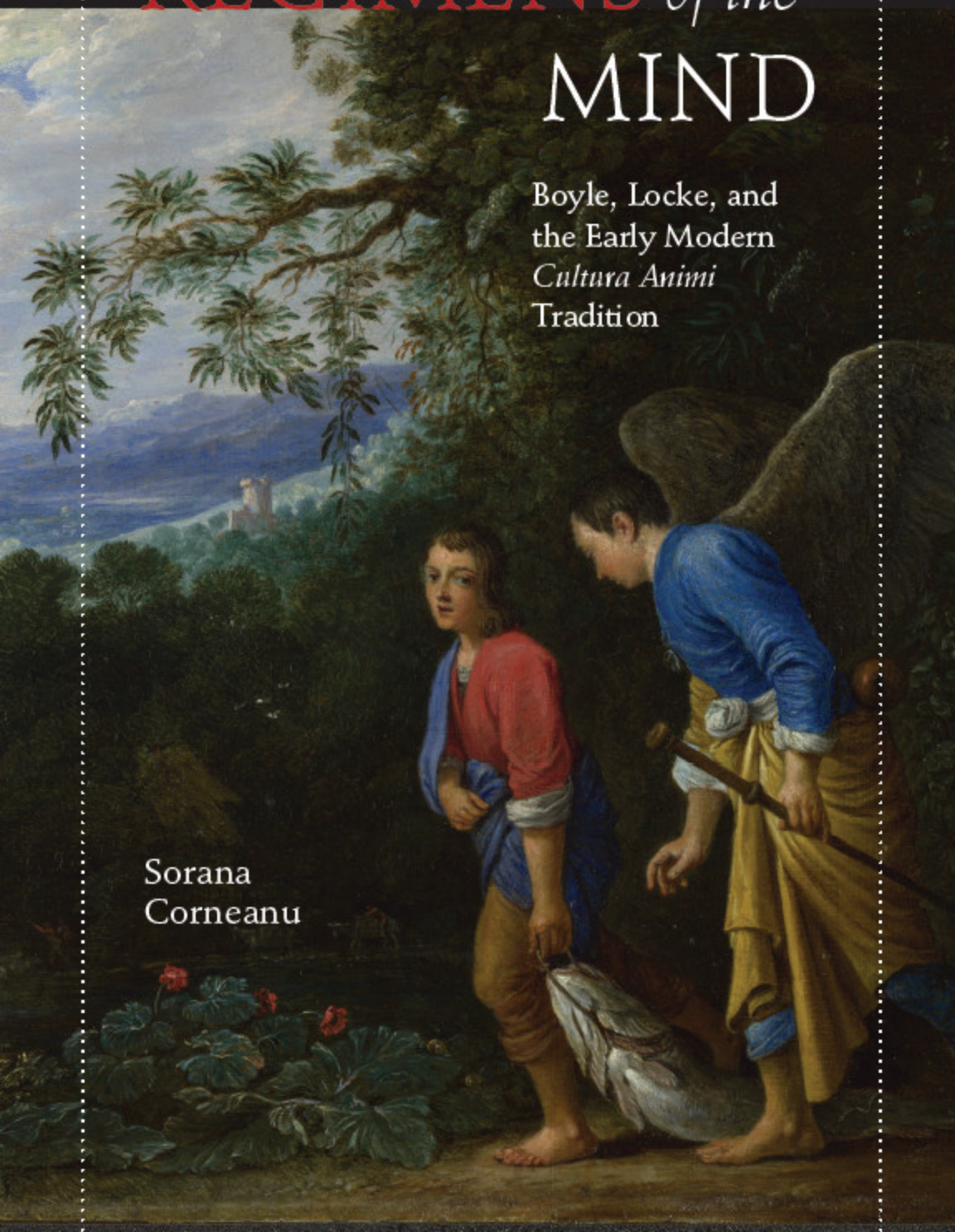


REGIMENS *of the* MIND

Boyle, Locke, and
the Early Modern
Cultura Animi
Tradition

Sorana
Corneanu



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Cultura Animi Tradition

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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” (*ministraciones*) 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 concern⁸ 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).

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 mind⁵ 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 mind¹² 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 pre-disposition” (*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 idoloc 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 principles²⁹ 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 angustis*), 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 acceptance 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 tintured 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 be 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 inter-related 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.

Cultura and Medicina Animi: An Early Modern Tradition

The physician of the soul

The preoccupation with the powers and frailties of the human mind and with regimens for attaining its health and virtues was at the center of a body of literature that permeated the cultural space of early modern Europe. Rooted in various and at times diverging philosophical and theological doctrines, the anatomies of the soul, the treatises of the passions of the mind, the tracts of consolation or of wisdom, the works of pastoral care, the rhetorical treatises, and sometimes the logics of the time concur in signaling the urgency of the enterprise of diagnosing and curing the mind in the proper way. The claim to urgency was no doubt largely a response to the sense of crisis that traversed a Europe unsettled by religious and political strife, as well as by the multiplying challenges to theological and philosophical authority. Robert Burton's preface to his *Anatomy of Melancholy* (1621) is a compendium of the folly that seemed to have seized all human endeavors, from learning to politics and religion, besides the human frame and the natural world themselves: "all the World," Burton announces in the guise of "Democritus Junior," "is melancholy or mad."¹ Thomas Wright in his treatise *The Passions of the Minde in Generall* (1601, 1604) alludes to the Augustinian picture of a

similar universal overturning in *The City of God* XXII.xxii: man and world are subject to an all-pervasive array of “miseries and ills,” from vices to ignorance, from evil deeds to natural disasters, which are all attributable, in Saint Augustine’s theological scheme, to the sin of the first man.²

The core concern of such texts is nevertheless not a diagnosis of the world per se but a diagnosis of man. Rather than social policy, they are after a policy of the internal commonwealth of the human mind. The implication is that questions of social order are partly at least to be analyzed as questions of the ordering of the soul. But the investigation of the perturbed soul coupled with a search for remedies is seen as an endeavor in its own right, with a distinct standing, and following its own rationale. That rationale takes the form of anthropological-therapeutic questions, be they philosophical or theological, which are seen as informing, or as being informed by, questions of social order, without nevertheless being reducible to them.

Burton’s theme is the melancholic condition of both soul and body, and his project is to offer assistance in what he announces is man’s primary task: self-knowledge and self-reformation.³ Such assistance is the domain, he says, of the “Physitian” who manages to minister to both the bodily and the spiritual condition of man,⁴ a practice relevant to medical physicians as well as to “Orators, Philosophers, Divines, and fathers of the Church.”⁵ Wright, whose treatise Burton includes among his numberless references,⁶ also dwells at some length on the disciplinary position of his anthropological endeavor. In his prefatory chapter, he explains that the investigation of the faculties and passions of the soul is profitable in more than one way and serves the purposes of more than one discipline. It is a part of theoretical divinity (which analyzes the passions as special causes of sin, with its various distinctions) and of theoretical natural philosophy (which anatomizes the operations of the sensitive soul, in the manner of a *de anima* treatise). It is also the domain of medicine (where the passions and humors of the body are investigated as causes of diseases). But medicine is primarily a practical discipline, in the custody of the “Physitian of the Body.” Similarly, there is a medicine of the soul, which is the business of the “Physitian of the Soul.” Wright includes in this latter category a number of disciplines with a marked practical orientation: sacred and civil rhetoric (the field of Christian orators and of civil orators, e.g., ambassadors, lawyers); practical divinity (which assists the good Christian, “whose life is a warfare upon earth”); practical moral philosophy (which improves manners); and civil prudence (which teaches “gracious carriage” and “grateful conversation”).⁷

We have here a particularly comprehensive and explicit description of the territory of an early modern field of knowledge that is jointly theoretical and practical and that transgresses the institutional and disciplinary boundaries of the time. The physician of the soul stands at the crossroads of practical divinity, medicine, moral philosophy, and rhetoric and uses the analytical tools of theology and natural philosophy. His object is the human embodied mind, and his aim is the cure of its perturbations and the cultivation of its health or virtue, in the service of human beings, whether considered in their capacity as Christians, gentlemen, or scholars. There are, to be sure, variations in the analyses, diagnoses, and prescriptions of such early modern “physicians,” due especially to their theological allegiances. But the project is a common one, and I would like to suggest that the body of writings governed by it forms a relevant context for the program of the English experimental natural philosophy in the seventeenth century. Bacon, I have argued, writes just like such a physician of the soul whose purposes can be served by (reformed) logic, rhetoric, or moral philosophy. It will be the proposal of the next chapters that the Royal Society virtuosi in the second half of the century draw on both Bacon and the literature on the cure and cultivation of the soul in framing their understanding of experimental philosophy. In this chapter, after a brief survey of the main traditions of thought feeding this early modern field of knowledge, I will look at some of the important genres and themes and their development through the seventeenth century.

Sources

The early modern vocabulary of a “cure” or a “cultivation” of the soul is indebted to two main historical sources, which can be called the Socratic and the patristic traditions. The former is the promoter of the ancient idea of philosophy as a way of life, while the latter claims for Christianity the title of the true philosophy, in the sense of the true guide to life.

The Socratic discipline of self-knowledge understood as an examination of one’s opinions is present in a number of early Platonic dialogues, as is the idea that the care of the soul is the proper business of a philosophical life.⁸ The cultivation or education of the soul, the later dialogues agree, is the lifetime employment of the “lover of learning” and the score on which after-life judgment is to be passed: “The soul goes to the underworld possessing nothing but its education and upbringing.”⁹ The “care of the soul” is most properly described as a “filling up with true belief, knowledge, understanding, and, in sum, with all of virtue.”¹⁰ It is

also a healing, and virtue (which is eminently the “virtue of reason,” or wisdom) may indeed be described as a “kind of health, fine condition, and well-being of the soul.”¹¹

The philosophical care of the soul was also at the core of the Hellenistic and Roman schools of philosophy and informed the writings of Seneca, Cicero, and Plutarch, who drew variously on the Platonic, Academic, Stoic, and Epicurean trends of thought and whose philosophical syncretism was received with approval by the early modern European humanists.¹² A particularly eloquent account of the ancient schools’ idea of the care of the soul is in Cicero’s *Tusculan Disputations*, a work indebted to both Plato and the Stoics. It came to be particularly popular in the Renaissance, featured in the humanist school curriculum, and was a frequent reference in discussions of the passions. It was also the conduit for the popularization of two ancient descriptions of philosophy as *cultura animi* and as *animi medicina*.

Philosophy in its true sense as the ancient schools understood it, Cicero tells us, is a “cultivation of the soul,” a *cultura animi*. Cicero develops the agricultural metaphor along two lines: both a good-natured soul (a fertile field) and a good education (the tillage of philosophical learning) are needed in order to acquire wisdom and virtue. The proper work of philosophy is to weed out vices, till the soil of the soul, sow the good seeds of virtue, and grow the harvest of wisdom.¹³ Cicero varies the metaphor and also speaks, in medical terms, of the “cure” of philosophy (*animi medicina*), by analogy with the art (*ars*) of curing bodies.¹⁴ If we were capable of discerning nature as she is, and following her in guiding our lives, there would be no need of a method of instruction. We do have some small sparkles of insight and innate seeds of virtues, but they are easily quenched under the corrupting influence of beliefs and manners. Instead, we should allow them to ripen with the help of philosophy.¹⁵ The passions are “diseases” (*morbi*) or rather “distempers” (*perturbationes*) of the soul, being “Commotions of the mind rebelling against Reason,” while the state of the mind thus affected is aptly described as “madness” (*insania*).¹⁶ Conversely, a mind free of perturbations is a sane mind, whose “Temper” is characterized by “calmness and constancy,” and this is what we call wisdom (“the soundness of the Mind”) or virtue (“a Quality of the mind constant and uniform”).¹⁷ Although to apply itself to itself is difficult for a distempered soul, such self-cure is possible, and it lies in the right application of reason, called a “kind of Socratick medicine,”¹⁸ which fortifies the mind and is thus itself the very instrument of philosophy. This is possible due to a specific understanding of the passions: they are basically corrupt judgments (or include such judgments) that are

voluntary. The remedy for the passions lies thus primarily in a remedy for the mechanism of voluntary judgment.¹⁹

Recent scholarly work has unearthed the extent to which ancient philosophy was devoted to the cultivation of the soul. Pierre Hadot in particular has offered a resonant recuperation of the Hellenistic and Roman notion of philosophy as an art of living. Thus understood, philosophy is equivalent to “a concrete attitude and determinate life-style, which engages the whole of existence” and presupposes “a conversion of the life of the person.”²⁰ The Stoics, for instance, distinguished between the parts of philosophical discourse (physics, ethics, and logic) and philosophy itself, which was “the philosophical way of life,” a “unitary act, which consists in *living* logic, physics and ethics.”²¹ Juliusz Domański has also argued that the definitions of philosophy in the Neoplatonic and Stoic sources of the first centuries CE included both theoretical and practical elements (the former referring to the object, the latter to the aim of philosophy, often identified as wisdom). The sense of “practical” here, Domański writes, is that of neither a “science of mores” nor an “ethics of norms and exhortations,” but rather that of an ethics incarnate in the life of the philosopher (“une éthique réalisée”). As such, the “practical” side of philosophy is the “fourth element” added to the usual tripartite model of theoretical philosophy (logic, ethics, and physics).²² According to John Sellars, on this ancient conception, the *logos* of theoretical understanding is translated into practical ability by means of the training of *askēsis*, and the “care of the soul” names this very process of translation. Philosophy is thus an art “directed toward the transformation of the state of one’s soul into a good estate (*euexia*), developing its excellence (*aretē*) just as medicine transforms the state of the body into one of health.”²³

Philosophy as an art of living, then, is to be understood as a particular orientation of all the branches of philosophy, so that their study bears on the transformation, which includes both a cure and a training, of the psychic life of the individual. It is called an “art” (*technē, ars*), but it can also be called a “discipline.” Cicero says that Diogenes and Carneades are illustrious examples of “the noblest of Arts, the Doctrine [discipline] of well living.”²⁴ This art or discipline is not moral philosophy but philosophy with all its disciplines turned to an ethical purpose, in the sense that it incorporates knowledge within the character (*ēthos*) of the person.

The ancient philosophical conception of a school of training the soul fed the religious thought of the early Church Fathers. For Clement of Alexandria, Christianity was now the true philosophy: its aim was still *paideia*, an education of souls, but it could provide the true framework of the endeavor, since it possessed the revelation of the Logos.²⁵ Other

Greek Fathers, e.g., Philo of Alexandria, Origen, the Origenists, and the Cappadocian Fathers, also conceived of the Christian life in terms of an *askēsis* that involved, much as did the philosophical life, the government and purification of thoughts and passions, the acceptance of the divine will, and a reorientation of mind and heart.²⁶

Saint Augustine also called the Christian religion the “true philosophy,” which was to be distinguished from the pagan: Cicero and the ancients, Augustine says, believed that philosophy was a gift from the gods, greater than any other gift, apt to assist man’s fight with his own misery, but bestowed only on a few. There is some measure of truth in this belief, Augustine allows, but what the philosophers did not know is that the true name of the gift is the grace of the Christian God, which alone leads to the acquisition of the true philosophy. That it is accorded only to a few men is also true, which is a consequence of the fact that “humankind has been condemned to endure those miseries as a penalty” for the first man’s transgression.²⁷ Original sin is for Augustine the crucial historical event that completely determines man’s fate in the *saeculum*. Man’s fall was due to his “first evil act of will” bred by pride: it turned man away from God and onto himself.²⁸ Man lives now in the city of the love of self and away from the heavenly city of the love of God.²⁹ Augustine’s polemics with the ancient philosophy, in particular with the Platonic doctrine that once guided his own theology, leads him to give a radical interpretation of Saint Paul’s indictment of the “works of the flesh” in Galatians 5:19–21: the carnal life of fallen man is not simply attributable to the sinful “weight” of the body, but is a result of the corruption of the soul itself. The passions that trouble the soul, therefore, are not simply the result of the body’s action, but are the inner stirrings of a sinful soul.³⁰ In keeping with his analysis of original sin as a breach of rightful love and as a corruption of the will, Augustine’s account of the relevant mental life of a Christian is also couched in terms of loves and volitions. The will is itself to be understood as a species of love, as are all the emotions. Living according to God requires a right will, which is a good love; conversely, the wrong will of rebellious man is a bad love, and all the emotions fall into the wrong or the right side of the divide according to the evil or the good love that animates them.³¹

The life of a Christian, therefore, consists in a long journey whose aim is the reorientation of the will in the right direction, away from the self and toward God. Sin is nevertheless so ponderous that the only remedy for its misery is the upward movement of grace. Augustine’s story of his own Christian journey in the *Confessions* is the story of a penitent struggle with his “heaviness” in the expectation of divine grace. It is also the

story of a cure: Augustine calls God “my most private Physician” who is alone apt to “cure all my infirmities.”³² The mode of the confession is for Augustine the true mode of self-knowledge, since it opens the heart for the hoped-for action of the divine. Confession as penitent practice activates the right movements of the soul, which are of the order of strong, godly emotions: Augustine fights his own “heaviness” by praising and praying, by love and lament, by thanksgiving and bewailing.³³

The two main ancient sources I have sketched above informed the early modern picture of the physician of the soul in various combinations. Despite the tensions between the philosophical (Socratic) and the theological (Augustinian) anthropologies,³⁴ the common core preoccupation with remedies for a disturbed soul—a primarily practical preoccupation, aimed at reorienting and reconfiguring the operations of the human *psuchē*—made it possible for the early modern physicians of the soul to avail themselves of the instruments of both philosophy and religion, to conceive alliances between reason and grace, or reason and the emotions, and to imagine curative exercises that involved both Socratic and spiritual “medicine,” even if the varying proportions in which they did so certainly reflected diverse theological allegiances.

Genres

The genres of the early modern *cultura* and *medicina animi* can be seen as specialized expressions of the common, fundamental practical doctrine that Thomas Wright assigned in general to the physician of the soul and that Francis Bacon recognized in his reflections on the need for an art of tempering the mind. A survey of these genres as they were fashioned through the seventeenth century, together with an investigation of a series of central themes, will show how they translate the two traditions sketched above into early modern vocabulary and how, in so doing, they develop the self-styled and noncompartmentalized art of the cure and culture of souls. The interest of this survey is twofold: On the one hand, it indicates the existence of an early modern culture of regimens that develops with its own resources a cluster of themes and concepts that represent a specific approach to the problem of knowledge in its own right. On the other, this culture can be meaningfully seen as a nourishing intellectual pool for the thought of the English experimental philosophers, in two ways: first, the philosophers are known to have been familiar with a number of authors and texts in this early modern *cultura animi* tradition (so the emphasis here will be on these); second, the philosophers work

not only with the conceptual frameworks and vocabulary but also with the generic conventions developed in these texts.

Father Thomas Wright was a Catholic who, in the words of Theodore Stroud, represented a “test case for toleration” in Protestant England. With the support of the Earl of Essex and of the Bacon brothers (Anthony and Francis), he sought personal toleration before he could champion the Catholic cause, yet had to spend eight years in various English prisons. During his confinement he wrote several tracts, among which was *The Passions of the Minde in Generall* (written by 1598, first edition 1601, second revised edition 1604), a work that, unlike his other writings, did not take a stance on matters of religious doctrinal conflict. In a letter to Anthony Bacon, his protector, he explained the reconciliatory nature of his tract, acknowledged by the Bishop of London’s censor. The *Passions* proved a popular text, which went through five new editions and issues by 1630.³⁵

Wright’s text is a good clue to the array of the relevant *medicina-cultura animi* genres. Not only does Wright itemize the branches of the practice of the physician of the soul, as we have seen, but his treatise is itself a compendium of the relevant genres and a good illustration of the mixed influence of the two traditions. Its six books deal in turn with a psychological, *de anima*-style analysis of the faculties of the soul,³⁶ an explication of the physiological mechanism of the passions, and a theological account of the distempered soul as a consequence of the Fall (book I); a survey of the effects of the passions on the embodied mind (moral and cognitive perturbations, physiological distempers, spiritual troubles of the soul) (book II); a prescription of remedies (by means of self-knowledge and a series of philosophical and religious exercises, including the examination of opinions, the examination of conscience, and prayer) (book III); a physiognomic and behavioral investigation of the outward signs of the passions (book IV); a rhetorical minitreatise on how to move the passions (book V); and an exploration of the “defects and imperfections” of the understanding as ultimate causes of the passions (book VI). The latter topic is a curious addition to a treatise of the passions, and one especially relevant to the approach to the question of knowledge in the natural philosophical texts, to which I will return.

Another treatise of the passions written later in the century is an equally multigenre and cross-disciplinary compound: Edward Reynolds’s *A Treatise of the Passions and Faculties of the Soule of Man* (1640). An Anglican priest, Reynolds was in turn a member of the Westminster Assembly of divines (1643), Dean of Christ Church in Oxford (1648–50 and 1659), and Bishop of Norwich (1661–76). As Dean of Christ Church, he was John

Locke's superior during the latter's tutorship, and his treatise, which was to be taught at Oxford until the end of the century, is mentioned in Locke's notes before 1660.³⁷ The manuscript of this treatise was requested by, and dedicated to, Princess Elizabeth of Bohemia, who also prompted Descartes to write on the topic of the passions.³⁸

Reynolds's treatise mirrors Wright's in the range of its disciplinary breadth: it includes a natural philosophical ("psychological") and a theological analysis of the soul (faculties, interdependence between soul and body, postlapsarian corruptions), although unlike Wright's it does not include a medical analysis. It proceeds to a brief investigation of memory and fancy and an extensive one of the passions themselves, not so much in the manner of a "scientific" *de anima* treatise, but rather in tune with his professed faith in the "Culture of the Minde."³⁹ Reynolds investigates both the "offices" and the "corruptions" of these faculties and examines the ways in which they can be put again to good use. Such "culture" is the prerogative of moral philosophy, practical divinity, and rhetoric, and it builds on the "dignities" of the soul after the Fall, which form the subject matter of an entire section of the treatise. Reynolds also devotes several chapters to the "dignities" and the "corruptions" of the understanding itself, which mirrors Wright's book VI; both these developments of the genre of the treatise of the passions deserve special attention, and I will come back to them below.

The physician of the soul, as these treatises of the passions suggest, could use the combined resources of a Socratic philosophical culture and of a Christian pastoral care of souls. While the general purpose is the same (the recuperation of the health of the soul), the sorts of remedies singled out in various texts range across what could be called a spectrum of Augustinianisms. The core idea of a debilitating Fall is always in the background of these analyses of human nature, but the range of solutions highlight degrees of weight given to the work of reason, of the emotions, of religious exercises, and of divine grace. For instance, a number of "anatomies of the soul" written by theologians and poets associated with the Sidney-Essex circles, to which the Bacon brothers were close, are shaped as Christian adventures of fall and restoration. The latter is understood in terms of a "cure" provided by a combination of Ciceronian rational virtues and Christian faith and grace, with various authors emphasizing the one or the other element of the combination.⁴⁰

A particular species of Augustinianism also informs another early modern genre that purported to offer medicine for the soul: the rhetorical treatise. The orator and the preacher, as both Wright and Reynolds acknowledged, laid claims to a capacity of administering true "physick"

that were similar to those of the moral philosopher and the medical physician. Both Jesuit and Protestant rhetoricians understood the power of the eloquent word to work the required transformation in the soul that could reorient its loves and desires and thus also its noetic activity toward their proper object, God. Deborah Shuger has explained that in such works, e.g., Nicolas Caussin's *De Eloquentia Sacra et Humana* (1619) or J. H. Alsted's *Orator* (1612), the framing of rhetoric relied on the humanist Ciceronian ideal of eloquent wisdom grafted on an Augustinian psychology of the emotions: rhetoric was able, in Augustinian parlance, to "restore the true order of love."⁴¹

Various degrees of Augustinianism also feature in the distinct genre of the Protestant consolation treatise, where the examination of conscience could combine with the examination of opinions, the help of reason with the help from above. Such works of pastoral care in early seventeenth-century England looked to the alleviation of "spiritual afflictions" through the administration of "spiritual physick." Recent scholarship has shown that they were one important medium for the conceptualization of the nature and proper treatment of melancholy, and thus shared the task of the cure of this malady of soul-and-body with the medical works of the time.⁴² Philosophical therapies such as reflection, counsel, or conversation with a wise friend could variously combine with theological argument, religious meditation, and prayer, with the cultivation of penitent sorrow and the invocation of grace, and sometimes with medical prescriptions such as diet and physical exercise.

At the high end of the Augustinian spectrum in such works are the Puritan consolation tracts that valorize the salvific effects of repentance, suffering, tears, and godly sorrow, in line with the struggler of the *Confessions*. A slightly lower degree of Augustinianism allows some room to the work of reason by the side of the work of grace, e.g., in Joseph Hall's *Heaven upon Earth, or, Of true peace, and tranquillitie of mind* (1606), or John Abernethy's *A Christian and Heavenly Treatise, Containing Physicke for the Soule* (1622).⁴³ An even lower degree marks the consolations associated with the Anglican moderate religious trends in the seventeenth century. The rational work on the faculties is granted here a significant role in the care of souls, by the side of repentance and the invocation of grace. The moral life, which involves a training of the whole range of the human mind's capacities, becomes important for justification. It is thus possible for Restoration divines such as Edward Fowler or Samuel Parker, in contrast with hard-line Nonconformists, to reinterpret divine assistance through grace as the very healthy or virtuous temper of the mind.⁴⁴ For Simon Patrick, in his consolatory tract *The Hearts Ease, or, A*

Remedy against all Troubles (1671), the cure of the soul is to be the work of the cooperation of reason and grace, and proceeds by the exercise of the rational capacity in understanding the nature and value of things and by following the rules of patience, humility, and a holy life.⁴⁵ Patrick's sources combine the Socratic and the patristic traditions: he cites Marcus Aurelius, Boethius, Fathers of the Church, as well as scriptural doctrine.

As Jeremy Schmidt has shown, although there are marked theological differences between the Anglican tracts of consolation and the earlier Puritan works on the affliction of conscience, the therapeutic concerns are equally strong in both categories of works, and this line of practical divinity remains vital to the very end of the century. According to John Spurr, the pastoral approach of Restoration Anglican theology, represented by Fowler, Parker, and Patrick, as well as by John Tillotson, Isaac Barrow, Gilbert Burnet, and Richard Allestree (the probable author of the immensely popular *The Whole Duty of Man*, 1658), continued the legacy of Henry Hammond, Jeremy Taylor, and the Great Tew Circle, themselves indebted to the earlier English Church perspective of Richard Hooker and Lancelot Andrewes. In keeping with their core practical ethos, their concern was with the proper Christian life rather than with speculative doctrines, and they insisted on the cooperation of works and faith, of reason and grace, of human righteousness and Christ's righteousness as a way to salvation. Their religion was an ascetic course of life, aimed at a government of the soul undertaken as the prime Christian duty (the imitation of Christ), as spelled out by the covenant of grace. Their pastoral works (consolations, devotional works, and casuistical tracts) testify to this approach.⁴⁶ The influence of the early English churchmen and of the later "Latitudinarians" on the experimental philosophers' methodological and anthropological assumptions has been highlighted in important studies.⁴⁷ I would like to suggest that there is an equally relevant influence as far as their views on the "husbandry" of human nature is concerned.

The cure and the culture of the soul of man, and the government of both its affections and its opinions, were also the avowed purpose of one variant of the early modern consolation tract—represented by the widely popular Neostoic writings of Guillaume du Vair, Justus Lipsius, or Pierre Charron—which featured by the side of the pastoral consolations, the rhetorical treatises, the medical-moral writings, the anatomies of the soul, and the treatises of the passions among the generic expressions of the practice of the early modern physician of the soul. Both Boyle and Locke, let us note, were familiar with these sources, as was Bacon.⁴⁸ In refashioning the ancient *cultura animi*—often in its Platonizing Stoic

form—for a Christian world, the Neostoics recombined elements of the traditional sources of thought about the soul and its care in a remarkably influential way.⁴⁹ The Socratic and the patristic traditions are both present in their thought, although they resist the high Augustinian stress on culpability, repentance, and grace. For Guillaume du Vair in his *La philosophie morale des stoïques* (c. 1585), a work indebted to a Christianized Epictetus,⁵⁰ the cure of souls is an office that philosophy shares with religion: both are labeled in Du Vair's text our "physitians."⁵¹ Lipsius and Charron rehearse the Ciceronian vocabulary: philosophy performs an *animi cultum* that makes the soul great,⁵² and human wisdom proceeds by a "diligent culture" of the self.⁵³ The Neostoics also rehearse the ancient idea that the purging of the mind's diseases—its passions, errors, and self-love—through self-discipline is an act of piety and service to God. In his *De la sagesse* (1601), Charron writes, quoting Seneca, Lactantius, and Hermes Trismegistus: "A wise man is a true sacrifice of the great God, his spirit is his temple, his soule is his image, his affections are his offerings, his greatest and most solemne sacrifice, is to imitate him, to serve and implore him." The sentence appears almost verbatim in Du Vair's tract, which was one of the more immediate sources of Charron's. Lipsius also speaks of the "Temple of a Good Mind" in his Christian version of a Senecan consolation, *De Constantia* (1584).⁵⁴

A Neostoic approach also features in an Anglican consolation later in the century, which can be seen as a mixture of the Stoic letter of advice and the Christian tract of pastoral care: Peter du Moulin's *Peace and Contentment of Minde* (1657). Du Moulin was a royalist Anglican divine and known religious controversialist. In the 1650s he spent some time in Ireland and acted as tutor in the Boyle family. Boyle was thus personally acquainted with Du Moulin, and he may also have been familiar with his consolation tract.⁵⁵ At the Restoration Du Moulin was made chaplain to Charles II, and he also became a supporter of the early Royal Society.⁵⁶ His consolatory tract is divided into two main parts, devoted first to man's "peace with God" and next to his "peace with himself"—both coming as a response to the postlapsarian disorder of the human faculties. The former, which is the matter of the first book, can be acquired through the exercise of the theological virtues of faith, hope, and charity, through religious meditation, repentance, and prayer, as well as through the study of Scripture and nature. The next three books are devoted to man's "peace with himself" in a manner openly indebted to Epictetus and Charron. The rectification of opinions and the government of the passions belong to this more earthly and, in Du Moulin's hands, more voluminous regimen.

A good number of the texts of the *medicina-cultura animi* genres I have surveyed here (in particular the treatises of the passions, the consolations, and the works of wisdom indebted to a mitigated Augustinian position, which can be identified in the works of the Anglican divines, of a Catholic like Wright, and of the Neostoics) construe their anthropologies in such a way as to make the theological and the philosophical traditions compatible with each other, and forge several conceptions related to the discipline and virtue of the mind accordingly. An analysis of the relevant themes in this respect will be the concern of the remainder of this chapter.

Utility: practical versus speculative knowledge

The *medicina-cultura animi* is above all a practical discipline. In emphasizing the point, the various physicians of the soul forge a vocabulary of “utility” associated with the prime task of their office, the shaping of souls, and operate a key distinction between types of knowledge in conformity with that task: knowledge that is “practical” can perform the required transformations in the soul, while “speculative” knowledge fails in that endeavor and is thus sterile. The defense of the practical and the critique of the speculative types of knowledge are conducted along several lines in the early modern period, all of which are served by the *medicina-cultura animi* genres.

The rhetorical treatises, for instance, are one prominent medium for the humanist attack on scholastic Aristotelianism, one of whose great failures was seen to lie in its inefficiency in inculcating virtue and thus in its inability to achieve the good life. The flourishing moral and, by extension, political life was a matter of *praxis* rather than *theoria*, which could best be achieved through the shaping powers of rhetoric.⁵⁷ The spiritual guidance of souls, too, could not rest on theoretical theology, but had to avail itself of the moving qualities of the scriptural Word and of the preachers’ sacred oratory. Scripture itself, as Matthias Flacius put it, dealt not with “speculative but with practical knowledge, which God wishes to be, above all else, living, ardent, and active.”⁵⁸ The *vita activa* was thus not only a matter of public engagement but also the crux of both humanist and reformed calls for an active life of the soul.

The Puritan works of pastoral care advanced the same vocabulary, which they subsumed in their concern with godly life. John Morgan has pointed out the complex, ambivalent relationship Puritan teachers had with the question of worldly learning, due precisely to their prime

concern with “godly utility.”⁵⁹ Knowledge derived from non-Christian sources could be permitted and even commended on condition it was used in such a way as to conduce to the living of a Christian life, but became dangerous if pursued as an end in itself. In the latter case it was mere “idle speculation,” a vain preoccupation of “sublimated and subtle wits,” which could lead only to confusion, and thus failed the all-important test of “use.”⁶⁰ The contrast “speculative” versus “practical” also features in the devotional works of the Anglican divines—which is indicative of the fact that, although separated by points of theological doctrine, the Anglicans and the Puritans shared the pastoral concern of the shaping of souls. Jeremy Taylor, for instance, wrote that “theology is rather a divine life than a divine knowledge,” and Edward Reynolds concurred: “theology is not a bare speculative science, which ultimately terminateth in the understanding, but . . . is a doctrine ordained and directed unto practice.”⁶¹ John Spurr comments that the “practical ethos” developed by Restoration Anglicanism was understood as a “reaction to the speculative and ‘experiential’ religion of the Interregnum,” that is, to both the doctrinal wars and the Puritan piety of “experience” (searching for the testimony of the spirit within).⁶² On the other hand, as we have seen, although the Anglicans and the Puritans described their respective brands of piety in opposition to each other, they both stressed the utility (i.e., ethical fruitfulness) of practical knowledge against (sterile) “speculation.”

A perfectly similar defense of practical, ethos-building knowledge against useless speculation features in the Neostoic texts, which echo the ideal of philosophy as an art of living. For Cicero, philosophy was “the Study of Wisdom,” which comprises “the Systems and Circle of all those Arts which relate to direction in the way of well-living.”⁶³ Most people do engage in the theoretical part alone, and thus use the doctrines of philosophy “for Ostentation of Knowledge,” not for a “Rule of Life.” But in doing so, they fail “the proper work of Philosophy.”⁶⁴ Similarly, for Lipsius, the circle of studies governed by the “nine muses” should be taken only as a “preparation” for virtue. Those who “have their knowledge to no end but to know” are “vaine, speculative, and given to no fruitful or profitable studie.” They use knowledge for “vaine ostentation,” instead of putting it in the service of curing and “beautifying” the mind.⁶⁵ Charron also thinks that “humane wisdom,” which is the fruit of philosophy, is “the true science of man, for it gives instructions to live and to die well.” As such, it resembles the “divine wisdom” as taught by Christian divines: the latter is “in some sort Practique” (since the knowledge of divine things is incorporated into a “iudgment and rule of human

actions"). It is thus to be contrasted with the divine wisdom taught by scholastic metaphysicians, which is "altogether speculative" and may well be "without either honestie, action, or other morall vertue."⁶⁶ Charron famously compares science unfavorably with wisdom, but we should note that his indictment of "science" is primarily an attack on a particular method of instruction that relies on memorizing and mechanical reporting of undigested material and that serves for ostentation and mercenary ends. But science or learning may be turned into "wisdom"—which is "a sweet and regular managing of the soule"—when "opinions and knowledges" are "incorporated" and "transubstantiated" into oneself. Natural knowledge, if thus used, may also serve wisdom, by the side of moral philosophy and practical divinity.⁶⁷ These descriptions of the office of (true) philosophy make the distinction between "speculative" and "useful" along the lines of the ancient division between the "theoretical" and the "practical" sides of philosophy.⁶⁸ The practical/useful includes the theoretical/speculative (as instrument in the cultivation of a virtuous mind), but not necessarily the other way round: the theoretical/speculative devoid of the practical/useful is bad philosophy, pursued in vanity for the sake of mere knowledge.

The humanist, Puritan, Anglican, and Neostoic lines of defense of the utility of practical against speculative knowledge are indebted to various traditions and agendas, but coalesce around the same rationale. They form a relevant context for Bacon's twofold notion of "utility" and his critique of "speculation," as well as for the defense later in the century of the "usefulness" of experimental natural philosophy—a "usefulness" that Robert Boyle, for instance, saw not only in terms of the production of "works" but also explicitly "in reference to *the Minde of Man*."⁶⁹

Self-love and the fallen/uncultured mind

The utility of the *medicina-cultura animi* practice is a consequence of its anthropological core: it is because the human mind or soul is in a disturbed condition that a regimen for its cure acquires the quality of usefulness. In this section I want to single out a particular anthropological strain—one framed between the Augustinian and the Socratic poles—that I propose is relevant for the English experimental philosophers' attitude to human nature.

Pierre Charron dedicates the first book of his immensely popular tract *De la sagesse* (1601)—rendered in English as *Of Wisdome* in 1606—to the "consideration of man," or the foundational step of self-knowledge on

the way to a Socratic “humane wisdom.” In the “natural” branch of this exploration, Charron anatomizes the faculties and operations of the soul and at the same time lists the “maladies” or “defects” of man’s mind (*esprit*). The mind is prone to a “perpetuall motion without rest” and pursues its enterprises “rashly, and irregularly, without order, and without measure,” due to a combinations of factors, among which are corporeal changes, the infinity of the objects presented to the mind, and, especially, the inner “agitation” of the soul itself.⁷⁰ The latter is expressed in the passions of the soul, which are due both to a weak and erroneous judgment performed with the help of the imagination, and to an irregular will. Charron’s references here are both to Epictetus’s description of the passions and to Saint Augustine’s “wicked will,” which we inherited from the Fall.⁷¹ “Presumption” (or “pride” or “self-love” or “self-adoration”) is the central descriptor of both the “natural” and the “moral” consideration of man for Charron. It is the chief *natural* malady of the soul, described in Augustinian terms as “the first and originall fault of all the world” and the principal plague of mankind.⁷² It is also, by the side of vanity, weakness, inconstancy, and misery, one of the central *moral* failings of man, whose description Charron supports with two alternative lists of references, biblical (Job, Solomon) and philosophical (Democritus, Plutarch, Seneca). In keeping with the latter references, his moral analysis of presumption is centered not on an Augustinian bad love but on the narrow preoccupation with the self in one’s habits of judgment: credulity (a “facilitie to believe and to entertaine whatsoever is proposed”), obstinacy in maintaining lightly examined opinions, and aggressive dogmatism in imposing the same on others (as can be seen among the “enthusiasts”).⁷³

Charron performs here the same association we have noted in Bacon’s doctrine of the idols of the mind, between the maladies of judgment or assent and self-adoration. Again as in Bacon, the fight against self-love thus analyzed can proceed by reflection and self-examination, by the conjoined cultivation of humility and of virtuous faculties (“a sound judgment” and “a right will”), and by the building of “resolution, and constancie of the mind.”⁷⁴ In both cases this conception is based on a particular understanding of self-love, which in Charron’s case rests more explicitly on his blend of references. Placing Augustine by the side of Seneca on the question of self-love has two main consequences: one is that the diagnosis of the “uncultured” state of the soul⁷⁵ is equivalent to that of the fallen soul in severity and complexity; the other is that the remedy is not uniquely the prerogative of divine grace, but can, within human limits, proceed by human “culture.”

In his anatomy of the passions of the mind, Thomas Wright also identifies self-love as their principal root and explains it in terms derived, again, both from Augustine and from the philosophical tradition. Self-love translates as both fallen man's "infection" and as a resistance to philosophical cure that proceeds from the lack of a true knowledge of the self and of its distempered state. In support of the latter notion of self-love Wright cites Plato's *Laws* and Aristotle's *Nicomachean Ethics*.⁷⁶ For Wright, self-love is both the cause and sign of man's defection from God and a state of the uncultured soul associated with lack of prudent meditation, poor education, resignation to easy and immediate satisfaction, and incapacity to pursue virtue with resolution.⁷⁷ Consequently, his list of remedies for the perturbations of the soul includes both philosophical and religious exercises, accompanied by a "resolute good will and endeavour" and by seeking "succour from Heaven," in a "continuall practise of [one's] owne soule."⁷⁸

The double sphere of self-love suggested in the works of the Catholics Charron and Wright is preserved in Peter Du Moulin's Protestant tract of consolation in midcentury. The first step in the endeavor "to learne the right government" of oneself is to acknowledge that our postlapsarian souls are ruled by discord and confusion, and thus that the nature of man's spirit is "blind and rash."⁷⁹ But to do so is already to prove humble and ready for an education in moderation and wisdom. Du Moulin uses thus the mixed Christian-philosophical therapeutic *topos* that the cure begins once you become ready for the cure, which is first and foremost to curb your self-love and acknowledge your folly and need of repair. In his framing of self-love, he rehearses the conjunction between self-love and ungoverned judgment: it is "presumption, and a blinde immoderate love of a mans selfe" that is responsible for the "perpetuall unquietness and vacillation" of his mind.⁸⁰ To curb self-love, man must cultivate humility, which translates, again, as a discipline of judgment against obstinacy and arrogance: under its guidance, man "will labour to heale himselfe of all arrogant opinions and obstinate prejudices, being alwayes ready to receive better information and submit himselfe unto reason."⁸¹ In conformity with this double frame of reference, Du Moulin's definition of virtue bears unmistakable Christianized Stoic echoes: it is a "calme state of the Soul, firme, equall, magnanimous, meeke, religious and beneficiall to a mans selfe and to others."⁸²

The analysis of self-love is one element—a central one—of the more general assessment of human nature. The double reference (the Augustinian and the Socratic) operates at this general level, too, and it rests on an account of both the "corruptions" and the "dignities" of the human

mind after the Fall. It will be noted that talk of dignities does not necessarily entail a softer account of the corruptions, but can stand side by side with a very harsh, indeed Augustinian, assessment of human nature. One good example in this sense is the work of Philippe Du Plessis Mornay, the French Huguenot who was the friend and favorite theologian of Sir Philip Sidney and his circle, of which Bacon and his brother were also members, and whose *De la vérité de la religion Chrestienne* (1581) was also known to Boyle and Locke.⁸³ Its plea is for a religion rationally embraced, which presupposes not a submission of faith to reason but rather a submission of reason to faith on reason's own decision.⁸⁴ A central point of Mornay's argument is that human nature is corrupted by the Fall, for which the will carries the main guilt, and which resulted in the disorderly state of the human faculties, its passions and ignorance. In an irenic move, Mornay surmises that this Christian conception (which he supports with the authority of Saint Augustine and the Scriptures) was shared by the ancients: the Pythagoreans, the Stoics, and the Neoplatonists agree with the Christians that man is fallen from an original perfect condition and that he bears the entire responsibility for his fault. They are all equally agreed that religion alone can purge the soul of its corruption and bring it back to God,⁸⁵ and that it does so by working on the remains of man's excellence, goodness and light. These lie in the superior part of the soul, which represents what man *is* most properly speaking.⁸⁶ Religion includes an inward service to God, whose instruments are man's superior faculties, the will and the understanding. The "purgation and perfection" of these faculties, or the study of wisdom, is the main route toward becoming reunited with and rendered similar to God—a point on which Mornay thinks, again, that both theologians and philosophers (especially the Platonizing ones) agree.⁸⁷

Later in the century, Edward Reynolds's treatise of the passions is similarly organized around the "dignities" and the "corruptions" of the mind after the Fall. We are fallen creatures, and the damages proceeding from that fundamental event are severe indeed. It is also the case, though, that recuperation is possible to some degree, and "our renovation in knowledge is after the image of him that created us" (cf. Colossians 3:10).⁸⁸ Reynolds recommends the knowledge of a man's self as the crucial step in that renovation, an enterprise that has the historical support of patristic wisdom.⁸⁹ In a move similar to Mornay's, Reynolds invokes the mixed Christian-Stoic *topoi* of man as bearer of the divine image and as "one of the most perfect Models of created excellencie."⁹⁰ The "culture" of man's nature is thus possible because it builds on the remnants of prelapsarian perfection, which is to say, on the remnants of the divine attributes as

they were reflected in man at the first creation. Thus, for instance, God's wisdom in ordering and preserving his works is partially preserved in the light of nature and the principles of practical prudence that are still in the soul of man (an equivalent of the "sparks" of wisdom and virtue). God's knowledge in the contemplation of his works is matched by the "vast and impatient desire" of an "active and restless spirit" that needs to search and to perfect itself.⁹¹ Knowledge, Reynolds thinks, is the very instrument of that progress, activated by restlessness of spirit and working on the remnants of wisdom in the soul.

This anthropological conception allowed for a variant of Augustinianism that remained severe in the diagnosis of corrupt human nature but made room for a notion of cure that could make use of the combined strengths of the philosophical and the religious traditions, as well as for an irenic theological policy. On this view, which is distinct from both Deist rational religion and from the strict Augustinianism of early modern radical Protestantism or Jansenism, man is corrupt, but he is not completely depraved and not totally inscrutable. The belief in man's corruption carries the load of both Christian transgression and Socratic lack of nurture, and imposes a severe task on the individual, unlike the "facile optimism about human nature" of later strands of rational religion.⁹² But this conception is equally distinct from bleak Augustinian pessimism about human nature: the overcoming of corruption is conceptualized neither as a mysterious conversion by grace nor as an incomprehensible justification before God, and human agency is neither denied nor reduced to Luther's conformity under coercion or to Pascal's habituation of the "machine." The stress is rather on a "husbandry" of the soul performed by the conjoined action of human effort and divine assistance.⁹³ It is a similarly mitigated Augustinian or Augustinian-Socratic anthropology, poised between blunt optimism and rigid pessimism, and oriented toward the husbandry of the soul, that I want to claim is the ground of the English experimental philosophers' program for the reformation of knowledge and of knowers.

The office of reason

Descriptions of the office of reason in an early modern *cultura animi* context are often indebted to a Stoic line of thought, and several key themes in this respect are developed in the Neostoic texts. In the first place, they take a high view of reason and perform a distinction between "(right) reason" and "opinion." Lipsius writes that right reason is "*a true sense*

and iudgement of things humane and divine (so farre as the same appertaineth to us)," and is to be contrasted with opinion, which is "*a false and frivolous coniecture of those things.*"⁹⁴ Charron agrees: opinion is "a vaine, light, crude and imperfect iudgement of things drawn from the outward senses, and common report, settling and holding it selfe to be good in the imagination, and never arriving to the understanding," and as such is the spring of "all passions" and "all troubles." In contrast, reason is "a true, perfect and solide iudgement of things," which is attained if opinions are "examined, sifted, and laboured."⁹⁵ As true and solid judgment of things, *right reason* is made to cover both the sense of correct ratiocination in conformity with the truth of things and the sense of a perfecting action of the mind. As Lipsius puts it, reason "is an excellent power or faculty of understanding and iudgement, which is the perfection of the soule, even as the soule is of man."⁹⁶ As such, it also has a religious office: not only is reason of divine origin but, as a means to the perfecting of the soul of man, the cultivation of reason is indeed a *cultum dei* and a *sequela dei*.⁹⁷

The Neostoic definition of the virtue of the mind, alternately called health or wisdom, is in conformity with the idea that it is reason's office to "perfect" the mind. For Charron, wisdom is a "constant health of our mind," and Du Vair defines virtue as "healthfull reason" voluntarily directed toward the good.⁹⁸ This view is again an echo of the *Tusculan Disputations*. For Cicero, virtue is equal to right reason and can be described as "a Quality of the mind constant and uniform."⁹⁹ Constancy (*constantia*) is indeed the name of the healthy "temper" of the soul and is the "fruit of knowledge,"¹⁰⁰ while the queen of virtues, which helps preserve the constancy of the soul, is called "temperance."¹⁰¹ In Lipsius's definition, constancy as a "right and immoveable strength of the minde" is also a guard against the vicious state of the mind, which, for Lipsius as for Charron, Bacon, Wright, or Du Moulin, is doubly characterized by pride and by obstinate judgment. "Strength," he says, should be associated with the solidity of right reason, not with the obstinacy of light opinion. The latter is the mark of a "stubberne mind, proceeding from pride or vaine glory."¹⁰² If the chief virtue in the Neostoics' texts is sometimes called *temperance*, some other times *prudence*, it always stands for, in Jacqueline Lagrée's description of Lipsian *constantia*, a disposition of the mind characterized by "firmness, order, endurance, equilibrium and permanence." This disposition is the result of a discipline of judgment, of emotions, and of will that leads to both strength of character and to solid and coherent representations in the soul.¹⁰³ The discipline involves an attentive examination of opinions and rests on the assumption that both errors of judgment and wrong actions are ultimately due to bad

dispositions of the mind in assessing the truth of representations and the value of things.

The key notion underlying the analysis of these bad dispositions is the Stoic notion of *assent*. Assent is the voluntary operation by which the mind accepts or gives its accord to “representations,” or “impressions,” and thus forms beliefs or judgments.¹⁰⁴ It is also a notion that unifies the theoretical and the practical sides of reason.

For Cicero, the main mechanism of the passions is a mechanism of judgment that he couches in the Stoic language of assent. The kind of belief involved in the formation of a passion is, the Stoics think, due to a weak assent (*opinationem autem . . . volunt esse imbecillam ad sensationem*).¹⁰⁵ In contrast, a firm, temperate mind is one capable of “self-confidence,” which is “a kind of Science and stedfast opinion of one yielding his assent upon good grounds only” and without rashness (*scientia quaedam est et opinio gravis non temere adsentientis*).¹⁰⁶ Galen, in *The Passions and Errors of the Soul*, a text indebted to Plato for its theory of the soul and to the Stoics for its conception of judgment formation, also speaks of the “weak” or “hasty” assent involved in the formation of erroneous beliefs either in moral or in scientific judgment. The greatest error in man’s conduct lies in his premature conclusions about good and evil in human life; similarly, errors in scientific judgment come from “hastily accepting as evident things which do not really have this status.”¹⁰⁷ Galen adds that the cause of such hastiness in the mind’s assent is actually a distempered desirative state: its insatiability or “desire for more” (*pleonexia*).¹⁰⁸

Thus, “assent” allows an identification of the vicious state of mind that stands behind both errors and passions as the *intemperance of an inconstant, precipitate mind*: a precipitate or rash or a changeable and weak assent to unclear or false impressions is the behavior of the inconstant “fool.” Conversely, it permits the unification of moral and intellectual virtues around the *constancy of a firm and tempered mind*: a firm and orderly assent to true impressions is the sign of the wise.¹⁰⁹ The regulation of assent, understood as a constant exercise (a discipline) meant to develop a virtuous habit, is thus the core mechanism of the cure of the intemperance of the mind. A disciplined assent counters both errors and passions and makes possible both science and the moral life. Right judgment, as a firm and unchangeable disposition to assent to the truth and right value of things, is the very instrument of the art of self-government, and it is also the conduit to human freedom and happiness.¹¹⁰

The notion of “assent” thus understood is an important theme associated with the *cultura animi* cluster of concepts, which I claim are relevant to the view of the conduct of the mind in the English experimental philo-

sophical works. We have noted the important role it played in Bacon's account of knowledge, and we will see it reemerge in the virtuosi's works later in the century. Here I will note that this originally Stoic term was taken over by some of the *cultura animi* texts and incorporated into the framework of the idea of the "perfection" of the soul, understood as a combined work of reason and religion. "Assent" is an interesting notion because, in this early modern reworking, it comes to name a complex mental phenomenon that includes epistemic, affective, and volitional motions, in contrast with the early Stoic strictly cognitive assent. Moreover, it indicates the possibility of framing an integrated account of the passions and errors of the mind, as informing both moral action and scientific inquiry. We will look now at how the integration in question is a move self-consciously undertaken in the genre of the treatise of the passions.

Passions, errors, and assent

That passions are, at least partially, errors of judgment is a conception Thomas Wright could have learned from both Cicero and Galen, who are explicitly mentioned among his sources. Together with the imagination, he says, they contribute to the distempered state of the understanding, which can be described both in terms of violent motions and in terms of false belief: a "vehement apprehension and iudgment of the wittē" and a "false conceite in the minde," bred by false representation.¹¹¹ This is already to emphasize the cognitive component of the moral life and an occasion to insist on the faculty mechanism responsible for the mix of cognition and appetites involved in a distempered mind. But in his book VI Wright makes a further move that extends his epistemological investigations in an even more explicit way. His task is comparable, he says, to those of both the geographer and the medical doctor: he is after a complete geography of the whole soul (not only of the sensitive appetite), and moreover he aims to do for the soul what "good Physitians of the body" do for the corporeal part of man: to investigate both the nature and the causes of the distempers.¹¹² Among the latter are the "defects" of the understanding itself. In elaborating the topic, Wright will touch upon questions of the general pursuit of knowledge and of natural philosophy, placed within the domain of the "Physitian of the soul."

The defects of the understanding fall into several categories for Wright. A first section of his list includes theological considerations about the fate of man's postlapsarian mental powers (all men are born in sin and

ignorance).¹¹³ A second category includes illustrations of the limits and weaknesses of the cognitive capacities of man in matters theological and natural philosophical. Man is ignorant not only about God (hence idolatry), but also about himself (his own soul and body), and actually about the basest of creatures (a very ant is a creature he does not fully understand). Wright sounds thus a powerful skeptical note as to the extent of our knowledge, while, even more spectacularly, performing a *mise-en-abîme* of his own treatise. We are ignorant of most of the things that a theory of the faculties and passions of the soul and of the moral and cognitive powers of man (like Wright's own) is supposed to build on. Whether Wright's purpose in listing such points of ignorance (in an impressively long list)¹¹⁴ is to delineate the territory of the unknowable or of the not yet known is not entirely clear. What he does spell out is an otherwise Protestant point about the labor of knowledge—the general “difficultie in understanding” is due to the fact that “truth lies deep” and therefore truth cannot be attained without “sweat and industry”—and the antischism warning that the wrong way of dealing with this situation is to ignore these limitations and give free rein to the “dissenting and contradicting Sects” of philosophers.¹¹⁵ Bacon and later the virtuosi would have agreed completely.

As a complement to the *limits* of the understanding, the third category in Wright's list is devoted to its *distempers*. The first defect here is “curiositie in knowing things not necessarie.”¹¹⁶ Besides the more familiar injunction against prying into “mysteries,” Wright also speaks of curiosity as inquiring into other men's actions at the expense of self-examination, which he analyzes as a form of self-love, in the manner I have expounded above. The second defect in Wright's third category rehearses Charron's and Bacon's association of self-love with the effects of mismanaged judgment: even “the wisest” are not only in love with themselves, but idolatrously so, and it is this self-admiration that accounts for obstinacy in opinions, or the “paynes many men bestowe, in confirming their pre-conceived errors.” The third defect is “distraction,” the vice undermining mental concentration and perseverance: in the middle of the most serious meditations, in prayer or in study, men's minds “wander in forraigne countries,” and one is hardly master of one's own thoughts, but rather at the mercy of the devil, of his passions and imagination, or else of a general bad disposition of an “inconstant mind desirous of varietie and alteration.”¹¹⁷ Wright's third category includes thus disorders of the intellectual faculties that have to do with the general framework of the pursuit of knowledge: its inception (true knowledge of self and right formation

of opinions are blocked by self-love and obstinacy) and its progress (perseverance is thwarted by inconstancy).

Wright's map of the human mind includes an analysis of the limits and distempers of the understanding faculty, as distinct from the investigation of the psychological and physiological mechanism of the passions, while calling attention to the fact that the two are interrelated. The genre of the treatise of the passions is thus extended to cover epistemological territory, placed under the overarching aim of the investigation, the therapeutic exercise of the "Physitian of the soul."

A similar move toward an integrated treatment of the distempered mind is in Edward Reynolds's treatise. In treating of the "corrupt effects of the passions" on the understanding and the will, Reynolds analyzes the way passions mix with the process of judgment formation, which he explains in a full-blown language of "assent." One such effect he dubs "imposture or seduction": under the thrall of impatient passion, man "laboureth next to incline and prepare his Mind for assent, and to get Reason on the same side with Passion." Such impatient assent to false representations is coupled with a series of other passions or inclinations of the mind: we are inclined to give reasons for passions and maintain them because of "love of our Ease." Men are generally driven by "those two Credulous Qualities, of Ignorance and Feare," and are thus ready to receive all sorts of doctrines, "not onely willingly, but with greedinesse also," which may be called a case of "Voluntarie Humilitie." A second effect is to "alienate" or "withdraw" reason from an impartial examination of the objects of its desires. If generally truth is masked by passions, it is also the case that passion makes one unwilling to search for truth: Reynolds calls this disposition "Voluntarie Ignorance" and adds that it is mixed with fear of being deterred from vice.¹¹⁸

In a further analysis of the "defects of our knowledge," paralleling Wright's book VI, Reynolds includes the work of the passions in a more comprehensive analysis of "corruptions." There are, according to Reynolds, four ways in which knowledge is corrupted. The first is ignorance, both natural and voluntary, and we have seen the role of the passions in voluntary ignorance. The second is curiosity: the problem here is again not with the (forbidden) objects of curiosity but with the inclination to "conjectures" or "speculations" of a spirit neither patient enough nor disciplined enough to rest in solid demonstration. The third is the "uncertainty of opinions." "Opinion," for Reynolds, as for the Neostoics, is actually by definition uncertain: it is identified with "the Fluctuation, wavering, and uncertainty of Assents, when the Understanding is left

floating, and as it were in Aequilibrio," and is also associated "with a feare least the contrary of what wee assent unto should be true." Be it the effect of the disproportion between the understanding and its object, or of skeptical "Subtilty of wit," opinion is a corruption.¹¹⁹

Reynolds's fourth type of corrupted knowledge is "errour," which he defines as "a peremptory and habituall assent, firmly and without wavering fixed upon some falshood under the shew of truth." While the first cause of error is briefly identified as sin, the "secondary causes" form an analysis of error that looks back to Bacon and onward to similar treatments in Glanvill or Locke. The first cause, the "abuse of principles," has to do with two inclinations of the mind, one natural, the other vicious: on the one hand, the mind needs to have "something to rest it selfe upon" and build from there, but on the other it tends to use such principles, which are often false, as "a coloured Glasse" for every belief it forms (a species of the Baconian "tincture effect"). The second and third causes are an "Affectation of Singularity" in a vain mind that will form beliefs so as to stand out from the crowd, and "a too credulous prejudice and opinion of Authority." The fourth is constituted by the passions attached to the object of knowledge. Here Reynolds resumes the discussion of the "corrupt effects of the passions" mentioned above and adds that this is a pervasive miscarriage of our inquiries: "what was at first but a wish, is at last become an Opinion: *Quod nimis volumus facile credimus*, we easily believe what we will willingly desire."¹²⁰

A similarly integrated analysis of passions and errors is in Obadiah Walker's educational treatise *Of Education* (1673), a text that Locke knew and used in devising his own thoughts on education.¹²¹ Walker includes a minitreatise of the passions in his chapter on the "divers passions, inclinations, and dispositions of Man, and the wayes to rectify and order them,"¹²² where he also devotes some space to the task of "bettering the Judgment," which is occupied by a description of the maladies of assent. All causes of error, Walker explains, can be reduced to two heads: too hasty assenting on the basis of light foundations, which results in the mind's resting in the first appearance, and too long deferring of assent, which results in unwarranted skepticism.¹²³ For Walker, the government of the passions and the regulation of assent are interrelated aims of the education of the child's mind.

The analysis of error is a noteworthy development in the genre of the treatise of the faculties and passions of the soul. Both Wright and Reynolds use this genre to perform a unification of what Bacon classified as the domains of logic and of practical ethics, and they do so under the common program of the "physician of the soul" (Wright) or of the "culture

of the mind" (Reynolds). The unification is not only sanctioned by the endeavor of diagnosing the whole mind, with all its faculties, in order to devise possible regimens, but also reinforced by an analysis of the interrelations between distempered judgment and passions. The latter are sometimes described in terms of the motions of assent, which generate both passions and errors—an analytical model that these authors inherited from the Stoics via the early modern editions of such ancient transmitters as Cicero, Seneca, or Galen. While the technical term "assent" features in late scholastic logical tracts, too,¹²⁴ the particular richness of the notion as these *cultura animi* texts develop it—assent as a complex cognitive and affective phenomenon that is morally assessed—is more relevant to the comparable treatment in the natural philosophical texts. We have seen that this is the case for Bacon; the next chapters will argue that the same holds for the later English experimentalists.

The discipline, the virtues, and habituation

Self-knowledge

The *cultura animi* program starts from the premise that the first critical step in the regimen of the mind is self-knowledge. Depending on the severity of the Augustinianism at play in its variants, to know the self in this context generally meant to acknowledge and understand its diseased state, whether the next step was to turn oneself into a passive recipient of grace or to undertake an active husbandry of one's own soul. But the difficulties of self-knowledge were also emphasized, in various ways. For a Jansenist, inner life was inscrutable and self-knowledge ultimately impossible; in the eyes of Pierre Nicole, for instance, all that self-examination could achieve was a humiliation of self and a realization of man's impotence.¹²⁵ For those who did believe in the possibility of self-knowledge and in human capacity, the stress was on the momentous shift of perspective the act of looking at the self presupposed. The Socratic tradition was sensitive to the problems of asking a "sick" soul to become its own "doctor."¹²⁶ The analysis of self-love was a response to this problem, and in the hands of those willing to reconcile the two traditions, philosophical self-love was, at this level, perfectly parallel to Augustinian self-love: on both accounts, self-knowledge might be blocked by, and actually become illusory as a form of, self-love.

The answer could nevertheless resist the step to the inscrutability thesis, and to the consequent conclusions (inner passivity or external

coercive regulation). Both self-knowledge and self-reformation became possible with the establishment of a premise and of a condition. The premise was represented by the “dignities” of human nature: the Ciceronian seeds and sparks of virtue and knowledge, and the remnants of the image of God in fallen souls, among which was the divinely sanctioned desire for knowledge (Bacon’s “thirst for knowledge” or Reynolds’s “restlessness” of spirit). The condition had to do with the acceptance on the part of the “patient” of his diseased condition, which was a function not so much of knowledge but rather of a disposition of the will that could be obtained by the combined efforts of the individual and of the community: as Cicero put it, self-cure is possible for those who are willing to be cured (*qui se sanari voluerint*) and who are ready to obey the instructions of wise men.¹²⁷ A voluntary engagement on a course of training the soul, undertaken with resolution and diligence,¹²⁸ is the critical attitude that makes self-knowledge possible and thus enables the gradual escape from the circle of self-love. On the other hand, the figure of the wise man whose instruction the student of the self should obey—the emblematic Socratic figure that permeates both the ancient and the early modern *cultura animi*¹²⁹—functions as the external monitoring position that is involved in this distancing from the (diseased, self-loving) self. It features in Galen’s therapeutic treatise in the guise of the wise “pedagogue” whose role is to place before the student’s eyes the true mirror of his failings, by constant reminders, criticism, exhortation, and encouragement as well as by presenting himself as an actual example of the healthy condition.¹³⁰ It is also crucial for Thomas Wright, who rehearses the idea of the remedial importance of “wise and discreet” men or friends against self-love.¹³¹ The figures of the wise friend and the pedagogue are interchangeable in Lipsius’s revival of the Middle and Roman Stoic idea of friendship as the conduit to one’s moral transformation.¹³² A later seventeenth-century echo is the figure of the “tutor” in Walker’s or Locke’s educational treatises, who is both a paragon of virtue and wisdom and a skilled “physician” of the young soul.¹³³ To some extent, it will be seen that the community of natural philosophers takes on this monitoring role in the writings of the Royal Society virtuosi.

The cartographies or anatomies of the distempers of the mind are largely intended to function as a similar externalized scrutinizing tool. They cannot be complete and cannot be systematized into a methodical rulebook (as Bacon says, the doctrine of the idols cannot be digested into an art but can function only as a kind of prudential guideline), because they are the fruit of an ongoing, lifelong process of self-observation during the actual operations of the mind. They are also subject to revision,

since they rest on theories of the faculties or of knowledge that, as Wright warns, are themselves insecure owing to the limits of our understanding. Similarly, Bacon drew his chart of the idols of the mind and their causes while the natural histories of the faculties and passions of the soul were still to be written. But drawing these charts and keeping them in mind have a therapeutic function that surpasses their scientific security, precisely because they serve as an external mirror of our own device that breaks the circle of self-love and helps self-reflection even while we are engaged in mental activity. Wright recommends the consideration of the faculty mechanism of the passions even as we are seized by them, or reflection on the idea that they are rooted in self-love, as therapeutic techniques,¹³⁴ just as Bacon thought that consideration of the idols had remedial virtues by itself.

The discipline of assent

Since, as we have seen, the mechanism of assent, with its blend of cognitive, conative, and affective motions, lies at the core of the cartographies of the mind, the discipline commanded by self-knowledge thus understood will be fundamentally a discipline of assent. Tempering hasty judgment is for Galen a program of a life's self-training: "from early youth I cultivated the habit of avoiding hasty assents, both in matters apparent to the senses, and in matters apparent to reason; in these cases it is better to take one's time."¹³⁵ Techniques of managing assent are also among Wright's remedies for the passions: withholding assent when seized by a passion ("restrain, as much as you can thy consent as well as thou canst from yeelding unto it"), or suspension of judgment against the inclination to credulity when swayed by rhetorical discourse.¹³⁶ Reynolds, too, sketches a counsel for the health of the mind in terms of a discipline of judgment or assent, which proceeds by a "learned cautelousnesse of judgment" that makes the inquirer into his own opinions "so long suspend his Assent, till he had weighed the severall repugnancies of reasons, and by that means found out some truth whereon to settle his conceit."¹³⁷ A "due and mature suspension of judgment" was also a core recommendation of Bacon's program for directing the mind in inquiry.¹³⁸

Such talk of delaying, withholding, or suspending assent calls for some comment. The requirement featured in both the Stoic and the skeptical accounts of the rightful epistemic attitude, although the outcomes were different. The radical, Pyrrhonian skeptic suspends judgment entirely and thus lives "without opinions," because he thinks nothing can be truly and securely known. The moderate, Academic skeptic also thinks that

secure knowledge is not available, yet believes that some opinions are more probable than others, so that he will withhold assent until he finds the more weighty reasons supporting one over the other opinions. In contrast to both, the Stoic thinks that secure criteria of truth exist but that many of the impressions presented to the mind are unclear, and thus suspension of assent is meant to counter the mind's precipitate formation of false judgments so long as clear and distinct impressions are not available.¹³⁹ The early modern *cultura animi* texts take over a mixture of elements from these ancient sources. They retain the force of the management of assent as crucial in the government of the mind's inclinations, and thus in the regulation of both its desires and its cognition. The outcome is rarely described in terms of either the Stoic steadfast and secure knowledge or the Pyrrhonian living without opinions, but often in terms of an Academic skeptical (or Socratic) course of ongoing inquiry and revision of judgments. On the other hand, they also retain the description of the virtuous mind in terms of Stoic immovable "constancy," although what they emphasize is not the absolute certainty of knowledge but rather the strength of the mind countering weakly formed opinions and the whole array of the anatomized mental distempers.

Charron is a good example in this respect: wisdom, which is defined as a "constant health of our mind," consists in "the consideration, iudgement, examination of all things" without becoming "bound" to any opinion, but instead remaining "readie to entertaine better if it appear."¹⁴⁰ This is, he adds, the practice of the "temperate searcher of the truth" and of those wise men who have made a profession of "ignorance, doubting, enquiring, searching."¹⁴¹ Similarly, Reynolds's talk of weighing the various "repugnancies of reason" suggests that what he has in mind is an investigation resulting in the more probable opinion, rather than in absolute certainty; at the same time, he paints the portrait of the wise man in strong Stoic colors: his "severe and unmovable constancie of Mind in Vertue . . . should so compose & consolidate the Mind, and settle it in such stabilitie, that it should not all be bended from the Right, by any sensitive perturbations or impulsions."¹⁴² For Walker, too, the virtue of the faculty of judgment (wisdom or prudence) is acquired by "consideration, weighing or thinking much upon the probabilities on both sides" and by continuous meditation.¹⁴³

It thus becomes possible for the early moderns to associate Academic inquiry and Stoic constancy in a unitary account. In the hands of the experimental natural philosophers, this association will lead to the alignment of both certain and probable truths on the side of a firm, constant

mind, while “opinion” often remains the outcome of a feeble mind, incapable of rightful inquiry.

The virtues

The discipline of the mind counters both self-love and inordinate assent, the combined effects of which are the preoccupation, the credulity, the wavering, or the dogmatism of the mind, themselves infused by the mind’s desires and fears. The virtues that form the horizon of this discipline combine Stoic, skeptical, and Christian values: they are at once virtues of constancy, of inquiry, and of humility. One emblematic example in this sense is Du Moulin’s comprehensive representation of the master virtue of prudence. The prudent state of mind is defined as being “religious, just, constant, and temperate.”¹⁴⁴ It is often conquered by our “folly and precipitate rashness,”¹⁴⁵ but it is the aim of the continually resumed examination of opinions to form such a “golden temper” in our minds, which builds on the two “vertues of Justice,” meekness (or docility, or humility) and magnanimity (or generosity). Magnanimity makes the mind constant, while humility is crucial to the work of the renewed examination of opinions and the defense against obstinacy and arrogance.¹⁴⁶

The humble cultivation of inquiry into the grounds of our opinions is framed as the main defense against self-love. Once self-love is partly analyzed, as we have seen, as a distemper of the mind associated with unexamined opinions, credulity, and dogmatism, it becomes possible to grant the discipline of judgment the capacity to transcend the condition of self-love and to act as the conduit toward a healthy condition of mind. This condition is often described not only as “constant” but also as “universal.” Charron speaks indeed of the “universall” spirit acquired through self-denying inquiry, which he contrasts with the vain decision to become “married” to one opinion and become thus a “partaker and a particular.”¹⁴⁷ Similarly, Bacon’s “measure of the universe” is the opposite to the self-serving stance of the “measure of the individual.” Walker also talks about the prime task of education, which is to cultivate a “universall contemplation of the natures of things” and thus to form a free mind, disengaged from its servitudes.¹⁴⁸ The “universal” quality of the cultivated mind is therefore one that counters individual corruption, and is at the same time an expression of individual excellence. I will suggest in the next chapter that, in the context of the virtuosi’s account of the virtues of inquiry, “universality” thus understood is the (aretaic) alternative to what was later to be called the objectivity of science.

Habituation

The force of the account of the virtues in a *cultura animi* context rests on the notion that the mind can be transformed through a process of habituation. The understanding of the virtues as habits was a powerful Aristotelian notion that retained its force in the early modern period. But as far as the process of the acquisition of the virtues was concerned, Aristotle suggested that only the moral were acquired through habituation, while the intellectual were taught through discourse.¹⁴⁹ It was instead the alternative Stoic tradition that provided the resources for an interpretation of the training toward the excellences of judgment (both practical and theoretical) in terms of habituation. In fact, the integrated account of the mechanism of the mind in both the moral and the scientific life led to a unification of the account of the moral and the intellectual virtues—a move we have noted in Bacon, too, and that will be seen to hold for the later English experimentalists as well.

Thus, for both Cicero and Galen, the training of the mind's assent is a matter of habituation: the temperate or prudent disposition of the mind is a habit, one contrary to the habit of the distempered mind. Cicero calls intemperance, the fountainhead of all disorders, a habit opposite to temperance.¹⁵⁰ Galen describes the way in which the mind is habituated to error¹⁵¹ and tells us that he resolved to "cultivate the habit of avoiding hasty assents."¹⁵² The purpose of the ancient philosophical exercises was, as John Sellars explains, to achieve a transformation of character (*ēthos*) and thus of behavior and life (*erga, bios*), by means of a habituation or accustoming.¹⁵³ The formation of habits in the mind (habits of examination and of right judgment) is described by means of metaphors that point to a transformation in material, organic terms: the soul is "dyed" by the beliefs it entertains, or else ideas need to be "digested" if they are to be fully understood/lived.¹⁵⁴ An equivalent and quite popular image in early modern Europe, which we have already encountered in Bacon and will notice again in Glanvill or Locke, is the image of the "tincture" imprinted onto the mind by habits of judgment. Here is, for instance, Charron in translation, making crucial use of it: an "uncultured" mind is prone to "an obstinate and sworne preiudicate prevention of opinions, wherewith the mind is made drunken, and taketh so strong a tincture [*teincture*], that it is made unapt and incapable to see or to finde better whereby to raise and inrich it selfe." Conversely, the virtue of the mind, which may also be called "true honestie" or "goodness," can be understood to perform a similar action, although in the opposite direction, which is also the

“natural” one: honesty is “the true tincture of the soule, her naturall and ordinary course.”¹⁵⁵

The image of the “tincture” recalls the Stoic “dyeing” of the mind but possibly also carries the alchemical connotations of the term—tincture as the “soul” of a substance (usually gold) that could be extracted and then used to “tinge” another substance (usually silver)—which the early moderns would have recognized.¹⁵⁶ In any event, the image functions in our texts as an eloquent correlative of the notion of the transformation of the mind through habituation. Plutarch and, echoing him, Walker speak in the same sense of the need to be under “continually Physick,” since the cure of reason is not of the order of medicines if that means its work would stop with the healing of the malady. It is rather of the order of nourishment, which continues to fortify the “organism” of the mind by preserving the habit of right judgment.¹⁵⁷ Thus, the cure of the mind does not stop with the “extirpation” of its passions and errors; it is meant to be a continual, lifetime (and usually never complete) work of building and transforming the self.¹⁵⁸ In this sense, the semantic field of “culture” is more adequate as it suggests stages of “cultivation,” as in Cicero’s weeding out, tilling, sowing, and growing images. Similarly, it can be said that the passions and errors are not to be seen as excrescences that may be detached by means of a skillful single act of surgery. They are rather permanent tendencies or frailties of the mind, whose various degrees or forms correspond to the degrees of advancement of the mind on the way to health.¹⁵⁹ The program of the cultivation of the mind is thus not of the order of a medical recipe, much less of a set of external mechanical procedures but rather to be understood as a regimen of transformation or rehabilitation of the mind.

The English experimental philosophers in the second half of the century drew on and responded to this development in the early modern intellectual life. Experimental philosophy, they argued, is a privileged *cultura animi* practice. Not everyone accepted the claim, certainly,¹⁶⁰ but my task is to understand the specific shapes of this conception, the intellectual resources that made it possible, and the role it played in the development of their philosophy. The argument of this book is that this philosophy was deeply nourished by a *cultura animi* project, the specific contours of which I surveyed in this chapter. This means, in the first place, that the experimental naturalists construed the problem of knowledge as a problem of the ordering of the knower’s mind, and thus that their epistemological thought was rooted in a view of human beings that was jointly anthropological and therapeutic. In elaborating this view, they used the notions, vocabulary, and generic conventions of the

physicians of the soul. They worked with an anthropology of the mitigated Augustinian sort, devised cartographies of the distempered mind, and analyzed the passions and errors of the soul in an integrated manner. They took these cartographies as functional in the regimen itself, which included self-knowledge and the regulation of the mind's assents, desires, and will. They saw the outcome of the regulation in terms of reformed habits of mind, both of judgment and of emotion, and they claimed that their method of inquiry built the mind's health and strength, its nobility, generosity, and humility, and its "universality."

In the second place, this anthropological-therapeutic core of their attitude to the problem of knowledge was the driving force behind several key features of their philosophy. It reshaped such existing epistemological categories as probabilism and mitigated skepticism, and it provided one powerful line for the legitimation of experimental natural investigation. It also helped define a notion of usefulness that referred jointly to works for the public and to the work on the mind, and it generated a type of objectivity that is best seen as a virtue notion. Finally, it provided an argument for the value of the community of natural philosophers and for the relevance of the philosophical regimen to the well-being of the larger polity. An investigation of the anthropological-therapeutic core and of this set of consequences for the shapes of the English experimental philosophy in the second half of the seventeenth century will be the task of the next chapters.

Virtuoso Discipline

The cure of the mind and Solomon's House

In 1657 Walter Charleton wrote a dialogue called *The Immortality of the Human Soul*, which was meant to complement his previous apology for Epicurean atomism in *Physiologia Epicuro-Gassendo-Charletoniana* (1654). Charleton had been refused a fellowship in the College of Physicians in 1655, but he remained hopeful and painted the college in gratulatory colors in his *Immortality* as a Solomon's House that made real Bacon's utopia and as the "Great Luminary of the World," by the side of the equally promising Oxonian community that was to form the basis of the early Royal Society of London.¹ The *Immortality* is framed as an exchange among three characters, Athanasius (Charleton), Lucretius (John Evelyn), and Isodicastes (Henry Pierrepont, the dedicatee of the work). Before the actual conversation on the question of the immortality of the soul begins, the first dialogue represents a sort of double identity card, which sketches not only the pattern of the new natural philosophical institution but also the portrait of the new natural philosopher, couched in recognizable *medicina-cultura animi* terms and introduced via a consolation dialogue. Athanasius recounts his misfortunes and "disquiet" and asks for advice on how to come to "deport" himself "as becomes a Philosopher, with Constancy and tranquillity of mind." Lucretius responds by confessing that he is familiar with Athanasius's "Melancholy disposition" and proneness to "dejection," but also that his own ability as a "Physician for the Mind" extends no further than reminding Athanasius

of what he already knows, which comprises two main things: the “Morall Precepts, which you have been long collecting” and the curative effects of “gentle and Philosophicall Divertisements.”²

The reference to the moral precepts that Athanasius has been collecting is a transparent reference to Charleton’s work that introduced Epicurean ethics to the English world, *Epicurus’s Morals* (1656), in emulation of Pierre Gassendi.³ Charleton’s moral Epicurus is actually a blend of Epicurus, Seneca, Cicero, and Plutarch, in conformity with the ancient Hellenistic schools’ common program of offering the cure of reason to disturbed minds toward the achievement of philosophical tranquility, through self-knowledge and mind-ordering regimens.⁴ Comparable syncretism is also present in Gassendi’s general program for his work, where philosophy is defined as the love, study, and exercise of wisdom, and wisdom as the disposition of the mind whereby it embraces truth in all things and follows honesty in all actions. This understanding of the aim and scope of philosophy, we are told, is in tune with a tradition that includes ancient philosophers (Pythagoras, Plato, Seneca, Cicero, Epicurus, Lucretius) and early Fathers of the Church (Justin, Clement, Lactantius). All agree that philosophy as the search for wisdom is a true medicine for the soul.⁵

Epicurean echoes in this general moral sense can also be detected in Thomas Sprat’s *History of the Royal Society* (1667), which includes a section on the way experimenting itself is “usefull for the cure of mens minds.”⁶ It can be that, Sprat argues, owing to its active nature. The passions of men’s minds (the “violent *desires*, malicious *envies*, intemperate *joyes*, and irregular *griefs*, by which the lives of most men become *miserable*, or *guilty*”) are mainly due to idleness, so that the “medicine” lies in “earnest *employments*” coupled with “innocent, various, lasting, and even sensible *delights*.” Experimenting not only is supremely industrious in this earnest way but can also afford the innocent delights that can counter man’s “vanity and intemperance,” in a way that “the greatest *Epicure* has no reason to reject.”⁷ This is manifestly not a full-fledged endorsement of Epicurean wisdom; but Sprat does marshal Epicurean arguments about the therapeutic effect of the pleasures of the mind (as opposed to those of the body) in support of the idea that the study of nature can function as a medicine for the soul. A similar strategy features in Boyle’s defense of the moral benefits of experimental natural philosophy. Boyle distances himself from “Epicureanism” in general, yet he can only agree with Epicurus’s notion that the study of the natural world cures the soul’s fears, a notion of which we learn, Boyle says, from Diogenes Laertius and Lucretius, as well as his “best Interpreter, Gassendus.”⁸

The second head of Lucretius's advice for Athanasius in Charleton's *Immortality* referred to the "medicine" provided by "free and unbiased Philosophicall Conferences" in the company of friends.⁹ The theme of this second advice is that of an art of inquiry informed by the discipline of judgment and the rightful conduct of the intellect, which played a crucial role in the virtuosi's apologies for experimental philosophy and formed the crux of their critique of dogmatism. Athanasius complains that he has little hope for such conversations among the "hot and testy" French (the encounter takes place in Paris), and that he is, on the contrary, of a "Genius, which is so averse to all contests and passionate Altercations, and which alwaies brings me to Philosophicall Discourses only as to Enquiries, not final Determinations."¹⁰ Prudent inquiry in contrast to "passionate Altercations" and "final Determinations," or else to disputation and dogmatism, was indeed the *mot d'ordre* of the early Royal Society as put forward by its apologists. Joseph Glanvill, for instance, identifies both scholastic Aristotelianism and the religious "enthusiasts" as promoters of vain "notions" dogmatically affirmed in disrupting and sterile "disputes"; they are thus enemies of the "liberty of enquiry."¹¹ Thomas Sprat extends his quarrel with the Schools to include a critique of the "modern dogmatists," or builders of metaphysical systems: their well-rounded theories terminate the search into nature's secrets and can serve only vanity and contradiction.¹² Lucretius promises he will introduce Athanasius to a compatriot, Isodicastes, who should be the best companion and thus a provider of the "Physick" of wise conversation. Isodicastes' portrait as drawn by Lucretius is the portrait of the "perfect *Virtuoso*": he is a noble person both by birth and owing to his virtues, and a pursuer of knowledge for its proper "use," which includes both self-government and provision for life. He is also a master of the art of judgment: "a prudent Estimator of mens actions and opinions, but no rigid Censor of either. A valiant Assertor of truth, yet far from Tyranny." Moreover, he understands well the causes of error: "human frailty, and the obscurity of things in themselves."¹³

Charleton's sketch of the portrait of the new philosopher brings together the themes of an art of inquiry and of judgment, of useful knowledge, and of an awareness of human frailty, included in the general province of the "physician for the mind." The same cluster of themes features in Glanvill's continuation of Bacon's *New Atlantis*, an essay entitled "Anti-fanatical Religion and Free Philosophy" (1676). We are again in the vicinity of Solomon's House, and the Governor of Bensalem expounds the island's religion to his visitors. Glanvill's story is a quite straightforward text compared with Bacon's mysteries: it is a transparent

rendition of the post-Restoration Anglican project of a rational religion that could supersede Interregnum “enthusiasm.”¹⁴ Among the chief concerns of Bensalem’s divines, we are told, was the exercise of the liberty of inquiry and the search after truth. This exercise can be pursued, they thought, only by being wary in inquiry and remaining modest in opinions, avoiding both peremptory dogmatism and an “*unwarrantable Scepticism*.”¹⁵ Such epistemic modesty was praiseworthy both as a guarantee of charity and peace in the community, and as the “likeliest way of *Cure*” for the mind’s weaknesses, which were taken to be responsible for the social unrest in the first place. These divines devoted much of their study to the understanding of human nature and of men’s inclinations and passions, and they were fully aware, just as Isodicastes was, of the fact that human error and vice are rooted in human frailty: “They consider’d, that our Understandings, at best, are weak; and that the search of Truth is difficult; that we are very liable to be imposed on by our Complexions, Imaginations, Interests, and Affections.”¹⁶

Glanvill’s Bensalemite divines belong to the family of physicians of the soul reviewed in the previous chapter: both their religion and their philosophical studies are mainly construed as practical regimens for the mind. In describing their religion, Glanvill defends the “Latitudinarian” tenets of the minimal creed (there are only a few principles necessary to salvation), the role of reason in religion, the collaboration of grace and human endeavor, and the importance of the moral virtues (or of inward righteousness, in contrast with Calvinist imputed righteousness) for justification. Christianity is indeed the “highest improvement” of the moral virtues, and “the *power* of it consists in subduing *self-will*, and ruling our *passions*, and moderating our *appetites*, and *doing* the *works* of real Righteousness towards God, and our Neighbour.”¹⁷ If their religion is thus to a great extent a cure of souls, their “way of study” is equally framed to the same purpose. Glanvill describes a philosophical curriculum whose purpose is not knowledge per se (and thus potentially dogmatism and dispute), but the kind of knowledge pursuit that favors self-knowledge and the cure and cultivation of the powers of the mind. Their moral philosophy is founded on “the excellent *knowledge* of *Humane Nature* and *Passions*” rather than on ethical systems, and is pursued, in Ciceronian fashion, as a *lex vitae* rather than for *ostentatio scientiae*.¹⁸ Mathematics is praised mainly for its capacity to accustom the mind “to a *close way* of *reasoning*” and thus as a “good Antidote against the *confus’d*, and *wandering* humour of *Disputers*.”¹⁹ Their logic is opposed to the formal syllogistic logic of the Schools and can be called the “Logick of Plato” or the “*modest, Socratical way of Question*,” which avoids passionate and sterile dis-

putes.²⁰ Their “physiology” or natural philosophy is grounded in natural histories, which is a way of “assisting” reason by observations; inquiry into nature is pursued modestly, and “no *infallible* Theory” is asserted.²¹ They examine various doctrines—the Cartesian and the Gassendist, the mechanical and the pneumatic philosophies—without “adhering” to any as the final account of nature. They keep inquiry open and seek “to make *Philosophy operative*, and *useful*,” that is, a philosophy that teaches the mind to govern its tendency of forming “vain *Ideas* of fancy” and is at the same time productive of “profitable works.”²²

The theme of the utility of philosophy in this double sense is a transparent Baconian echo, and so is the framing of the branches of knowledge as arts of assisting and cultivating the intellect. At the same time, as we have seen, these are topics that were developed in the *cultura animi* literature of the seventeenth century, which is variously echoed in the virtuosi’s texts. Charleton’s “Physician for the Mind” and Glanvill’s Bensalemite divines bring the culture of the regimens of the mind into the precincts of Solomon’s House and claim for the new natural philosophy the status of a medicine for the soul. Glanvill’s Bensalemite curriculum indicates that this move is legitimated by the inclusion of a reformed natural philosophy within a circle of disciplines that are themselves reoriented toward an ethos-building type of knowledge pursuit. It is true that Sprat tells us that moral philosophy, by the side of politics and oratory, is an art on which the Royal Society virtuosi “have no mind to intrench.”²³ Indeed, they do not write moral treatises, but they do include in their natural philosophical tracts accounts of the distempers of the mind in a manner echoing the integrated anatomies of the passions and errors of the soul that formed the common ground of Bacon’s new logic and practical moral philosophy, and that also featured in the English treatises of the passions we have looked at. Equally, they do not write logic tracts, but their accounts of the natural philosophical way of inquiry do take the form of methods for directing and cultivating the intellect, which was the newly assumed purpose of a number of early modern logics, as it was of Bacon’s art of direction and of the discipline of the mental powers in the *cultura animi* genres.

An investigation of the significance of such conceptions for the experimental natural philosophy in later seventeenth-century England will be the concern of this and the following chapters. I would like to claim that several major features of this philosophy were shaped by a *cultura animi* project. Thus, the epistemic modesty that is characteristic of English experimentalism in this period is, I argue, a direct consequence of the anthropological-therapeutic assumptions about the human mind.

Accordingly, the mitigated skepticism and probabilism advocated by the virtuosi are motivated by a curative concern, and therefore these categories, which did feature elsewhere (in the late scholastic logics, Descartes, or Gassendi) in more straightforwardly epistemological contexts, are reinterpreted by the virtuosi in *cultura animi* terms. Equally, it is the notions elaborated in their charts of distempers and virtues of the mind that underlie their defense of experimental versus speculative or dogmatic philosophy, and thus one of the strong lines of legitimation for experimentalism is founded on a regimen approach to the human mind. Finally, such a reshaping of natural philosophy along the lines of a cultivation project is apt to throw new light on two issues that are also associated with the virtuosi's philosophy: On the one hand, the collective nature of the experimental activity is valued in their case not only as guaranteeing epistemic and social stability but also as creating a forum where minds are more easily purged with the help of "wise friends." On the other, the impersonal objectivity associated with modern scientific methods, results, and practitioners will be seen to be a distant (much more recent) relative of an early modern type of "objectivity" that in fact names a personal virtuous disposition.

Passions, errors, and method

Before looking at the virtuosi's approach to the reformation of the mind, I would like to briefly consider several developments in the genres of the treatise of the passions and of the logic tract as they were informed by the new Continental philosophies, which also included an integrated approach to the passions and errors of the mind, and which point to the role of a method of inquiry seen as a cultivating regimen. While these are indeed comparable developments, which the virtuosi do draw upon, it will be seen that these influences are grafted in their case on the Baconian and *cultura animi* tradition.

Walter Charleton's *Natural History of the Passions* (1674) is a treatise of the passions informed no longer by a scholastic-Galenic but rather by a Gassendist-Epicurean theory of the soul. Its purpose is nevertheless in tune with the *cultura animi* treatises: it is aimed at "the divine art of acquiring constant *Tranquillity* of Mind, by Wisdom or the right use of Reason."²⁴ For the concluding section on the "General Remedies" for the passions, Charleton's main source is Descartes, but a Descartes who is a synthesis of the *Méditations métaphysiques* (Latin ed. 1641, French ed.

1647) and of the *Passions de l'âme* (1649), two works that were also known early on to Boyle and Locke.²⁵ The interest of Charleton's text lies in its collation of Descartes's accounts of error in the Fourth Meditation and of the passions in the *Passions*; it thus brings to the fore the elements that make these accounts branches of the same endeavor, in a manner that remained only latent in Descartes's own writings. In his Fourth Meditation, Descartes explained the mechanism of error by positing a disparity between the scope of the intellect and the scope of the will, or between a limited faculty or power of understanding (which can perceive only a limited number of ideas in a clear and distinct way) and an infinite faculty or power of choosing. Thus, "the scope of the will is wider than that of the intellect," and error arises when "instead of restricting it [the operation of the will] within the same limits, I extend its use to matters which I do not understand. Since the will is indifferent in such cases, it easily turns aside from what is true and good, and this is the source of my error and sin."²⁶ The double reference to the true and the good, and to error and sin, in Descartes's account of error indicates not only the Augustinian framework of his discussion²⁷ but also the relevance of his analysis in the Fourth Meditation to the account of the moral life in the *Passions*. According to Descartes, the passions are phenomena of the union of soul and body; they are "obscure and confused" perceptions of the soul that are caused, maintained, and fortified by the motions of the corporeal spirits, and they are joined to representations that lead to judgments about the good or evil of things to which the perceiver relates.²⁸ Descartes does not detail the faculty mechanism of error in the *Passions*, but Charleton includes it explicitly in his *Natural History*: he distinguishes between a "faculty of *Discerning*" (the intellect) and a "faculty of *Assenting*" (the will),²⁹ observes that while the former is "not omniscious," the latter is "unlimited,"³⁰ and explains that error in both science and the moral life "ariseth from our assent to things whose truth or falsity, good or evil, we have not clearly and distinctly discerned."³¹ Charleton uses thus the accommodating genre of the treatise of the passions to perform the same unification we have seen in the other treatises, less tributary to the new philosophy, of the moral and epistemological realms insofar as they serve a common *cultura animi* program.

Charleton also rehearses with fidelity the Cartesian account of the remedies for the excessive passions in his *Natural History*, while also suggesting its congruence with Descartes's account for the remedy of error in the Fourth Meditation.³² Both remedies amount to a proper use of one's free will, Descartes thought. We have a "freedom of indifference,"

whereby the will is not determined to choose when the perception is obscure and confused. This is to some extent a defect, to be contrasted with the true freedom of choosing the true and the good “spontaneously,” i.e., without deliberation.³³ Such imperfection, he argues, is attributable not to God but only to me, who misuse the freedom I have to assent or not to assent, and judge in a precipitate manner (*je donne téméairement mon jugement*) of matters that I perceive only in an obscure and confused manner.³⁴ But it is also a useful capacity, since it makes it possible for me to withhold my assent when my perception is not clear and distinct. The proper use of this freedom lies in resolving to hold off judgment when perceptions lack clarity and distinctness, and in becoming habituated to doing so on a regular basis. For Descartes, this amounts to a discipline of judgment and self-mastery that represents “man’s greatest and most important perfection.”³⁵ In the *Passions*, he similarly speaks of “the exercise of our free will and the control we have over our volitions” (*l’usage de notre libre arbitre, et l’empire que nous avons sur nos volontés*), a capacity that “renders us in a certain way like God by making us masters of ourselves.” This is the only thing in us that can rightly cause us to esteem ourselves, and the “firm and constant resolution” to dispose of one’s volitions constitutes the key remedial disposition, *générosité*.³⁶ The proper use of our freedom with respect to the remedy of the excessive passions also involves a discipline of judgment: it lies in the “firm and determinate judgements bearing upon the knowledge of good and evil,” which the soul resolves to let govern her conduct.³⁷ Such a discipline, Descartes argues, should be capable of separating the corporeal motions (of the blood and animal spirits) from the thought to which they are usually joined when the passion is formed.³⁸ Constantly and resolutely pursued, the discipline will form virtuous habits in the soul, which “dispose it to have certain thoughts”; these thoughts will be fortified by the motions of the corporeal spirits. Virtue consists thus in a rehabilitation of the whole man, the union of mind and body.³⁹

To some extent, the Charletonian-Cartesian synthesis of the doctrines of the passions and errors of the mind and their remedy is in tune with the general approach of the *cultura animi* literature, but there are also differences. One major difference concerns the notion of “assent.” Descartes makes a radical move in attributing assent to the will versus the intellect and in explaining the mechanism of error by positing a radical disproportion between the two “faculties.” A much more common view makes assent an operation of the understanding itself, which is *voluntary* (“in our power”) without thereby being the unique prerogative of a sepa-

rately functioning *will*.⁴⁰ In the line of thought I am investigating, assent is in fact framed as a complex cognitive-conative-emotional mechanism with moral value, and is thus distinct from the Cartesian will-assent. On the other hand, the will-resolution understood as a general disposition and orientation toward the goal of self-reformation is characteristic of both Descartes and the *cultura animi* literature, as is the notion that the program of training results in reformed habits of thought and feeling. Another major difference has to do with the absence in the Cartesian account of an emphasis on the corruption and infirmity of human nature of the sort the other texts articulated by means of the double Augustinian-Socratic reference.⁴¹ As a consequence, Descartes finds no place for self-love or pride in his account, and the counterpart of the variegated charts of errors and distempers is in his case a sparse explication of a core mechanism. Assent or judgment, we have seen, was central to the treatises of the passions, too, as well as to the Baconian doctrine of the idols, yet in their case it was included in a much more complex (and colorful) picture.

But a comparably complex picture of error can be found in a work that is both Cartesian and Augustinian, and that is not a treatise of the passions but a logic tract: the *Logique ou l'Art de penser* (1662), written by Port Royal members Antoine Arnauld and Pierre Nicole. The third part of this work (on reasoning) ends with a discussion of sophisms. The very last chapter of this part swerves from a formal discussion and looks into the "false Judgments which are made of all sorts of things" in everyday life, and which are explained by a combination of Cartesian and Augustinian terms. The most conspicuous cause of such false judgments is the "irregularity of our will."⁴² The claim that it is the will that precipitates the understanding to judge in a hasty manner and thus fall into error is a reference to Descartes's account of error in the Fourth Meditation. But the authors have much more to say about the irregularity of the will: they develop the question under the head "Of the Sophisms, of Self-Love, Interest and Passion." The "sophisms" they talk about here are reducible neither to breaches of formal validity nor to the Cartesian "infinite will." They are rather "Delusions of the heart"⁴³ that betray a mind ill regulated in its inclinations and affections and above all a bad positioning of the self with respect to truth: "we judg of things not as they are in themselves, but as they are in respect of us: and Truth and Profit are to us the same thing."⁴⁴ Augustinian self-love, together with the action of inordinate passions, is responsible for people's forming judgments in conformity with their likes and dislikes, their loves and jealousies, with their

misplaced high opinion of themselves, or with their previous, scarcely examined, and self-sufficiently embraced opinions. Passions and self-love are the harbingers of credulity, obstinacy, the spirit of contradiction and disputation, or complaisance. Further, the mind lacks patience to inquire beyond the surface of things or the first results of investigation, or else is too easily seduced by either authority or eloquence, and thus hastens to superficial conclusions.⁴⁵ The *Logique* develops a long and variegated picture of errors, unlike anything in Descartes, but rather close to the non-Cartesian treatises of the passions, or else to Malebranche's extensive account of error in *De la recherche de la vérité* (1674–75), attributed in Augustinian fashion to the “misery” of sinning and criminal man.⁴⁶ The picture is also much more complex than the references to errors in Gassendi's *Institutio Logica* (1658), which may have served as a model for the *Logique*.⁴⁷ Gassendi only cursorily mentions the senses, temperament, custom, prejudices, authority, and ambiguity as possible causes of errors.⁴⁸

The general purpose of the *Logique* is the shaping of sound judgment. The description of the aim of logic is part of a general critique of the uselessness of the “speculative sciences” if pursued for their own sake—a critique that we have seen was also important to the *cultura animi* literature. To pursue knowledge without thereby seeking to “perfect Reason” is “sottish Vanity” and results in “Fruitless and Barren Sciences.”⁴⁹ The utility of logic lies in its capacity to remedy the “Irregularities of the Understanding” (*les dérèglements d'esprit*), which are responsible for errors both in the sciences and in civil life.⁵⁰ This statement of purpose is in tune with the late scholastic and early modern shifts in the conception of logic, toward a novel concentration on the operations of the cognitive faculties apart from the issue of formal validity, coupled with the redefinition of logic as a method for conducting the intellect's reasoning. While the late scholastic logics preserve the traditional format—one that typically deals with terms, propositions, and reasoning or argument, often with the addition of a fourth part, on method—they also assume the role of practical guides for correct reasoning. They take a normative approach to cognition, and their purpose is sometimes described as therapeutic insofar as they are supposed to remedy the epistemic infirmities of the intellect.⁵¹ These logics gesture toward an account of mind that looks at the workings of the cognitive faculties and raise the question of the mending of the weaknesses of the mind. Yet this development was secondary within the economy of these texts, which remained generally scholastic. In contrast, logic understood as a method for educating and

improving the natural powers of the intellect becomes a fully articulated idea in Descartes's philosophy.

In the second part of his *Discours de la méthode* (1637), the critique of formal syllogistic logic, which, Descartes says, teaches only ways of presenting already acquired knowledge, is accompanied by the proposal of four rules that he promises himself to abide by with "strong and unswerving resolution": never to accept anything as true that is not clearly and distinctly known, which is a way of avoiding precipitation (*précipitation*) and preconceptions (*prévention*); to divide the difficult questions into manageable parts; to follow order in his thinking, passing gradually from the simple to the complex; and to review the chains of reasoning as comprehensively as possible.⁵² Descartes's new logic is a method for guiding the intellect's operations with a view to discovery. As Daniel Garber explains, method here is understood as "a kind of mental exercise for training the intellect."⁵³ This logic comes in the form of guidelines or "precepts" that need to be held constantly present to mind in the actual process of thought and that result in an "accustoming" of the mind to conducting itself in the right way.⁵⁴ The process is thus one of self-training, accompanied by an engagement of the will-resolution kind, which Descartes also proposed for the remedy of the errors (and the passions) of the mind, and which was similarly expected to result in reformed habits. The first rule of Descartes's logic is actually an early formulation of the general principle for the remedy of error that Descartes develops in the Fourth Meditation. The conception of logic as an art of thinking or a method for guiding, purging, or cultivating the intellect is widespread among the new philosophers, whether they preserved the traditional format (e.g., Gassendi or the *Logique*) or not (e.g., Descartes or Spinoza).⁵⁵

The early modern logics and the treatises of the passions share a common ground. This common ground includes accounts of error explained in terms of the irregularities of the human faculties, be it sparsely as in the Cartesian picture of the will-assent extending beyond the reach of the intellect, or in more complex colors as in the *Logique's* list of the "Delusions of the heart" or else in Wright's or Reynolds's charts of the "defects and weaknesses" of the human mind. The common ground also includes the prescription of a discipline for training the judgment, which the new logics construe as the "method" of conducting the mind in discovery. The discipline is understood to work on the datum of the human propensity for error and thus to be the instrument for assisting the mind in a process with a double function: purging the mind of its irregular tendencies (and cultivating its strengths) and guiding it toward truth. It is precisely

such an endeavor of exploring the irregularities of the mind and ways of curing and cultivating it that can be traced not only in the seventeenth-century literature of the physicians of the soul, but also in Bacon's and the virtuosi's natural philosophical programs.

Idols and diseases of the mind

Joseph Glanvill's *Vanity of Dogmatizing* (1661) is one conspicuous example of a tract dedicated to the defense of experimental natural philosophy that not only takes a *cultura animi* approach to the mind and its regimens but also incorporates the format of the charts of errors and passions characteristic of the types of treatises of the passions I have investigated.⁵⁶ In discussing the dangers of "dogmatism," Glanvill places the issue within the larger question of the "disease of our Intellectuals" (i.e., of our minds). The current situation of the human faculties, Glanvill explains, is primarily due to the Fall of the first man; yet he believes that a "more particular account" is in order. The justification of such a detailed investigation points to a double *topos* in the literature on the cure of the mind: on the one hand, any attempt at living a good life must start with self-examination ("it is a good degree of *Knowledge* to be acquainted with the *causes* of our *Ignorance*"); on the other, the task is difficult and not everyone is capable of such preparative lucidity ("it is acknowledged by all, while everyone denies it").⁵⁷

Glanvill discusses in turn the weaknesses of the mind due to the inordinate operations of the senses, the imagination, the understanding, and the affections. The senses, Glanvill explains, do not mislead us by themselves; rather, error arises owing to our "*precipitate judgements*" or to the "unwary rashness of our *Understanding*."⁵⁸ The deceptions occasioned by the senses are mostly the fruit of our young years, when the understanding is still crude, "being almost meerly Passive to sensible Impressions, receiving all things in an uncontroverted and promiscuous admission."⁵⁹ The imagination is responsible, in conformity with a mixed cognitive-medicalized account, for the visions of the enthusiast, and it also has a more general role in the development of the vices of credulity and obstinacy, "impressing a strong perswasion of the Truth of an *Opinion*, where there is no evidence to support it."⁶⁰ But ungrounded "persuasions" are mostly the fruit of a precipitate assent. "Praecipitancy" is indeed the malady proper to the intellect: Glanvill insists on "the *forwardness* of our *Understandings assent*, to slightly examin'd *conclusions*, contracting many times a firm and obstinate belief from weak inducements; and that not

only in such things, as immediately concern the sense, but in almost every thing that falls within the scope of our enquiry."⁶¹

Glanvill identifies the maladies of assent as the core of the "disease" of the mind, in the same manner as Bacon, Descartes, and the treatises of the passions indebted to the Stoic account of assent. Unlike Descartes, but like all the others, Glanvill counts assent not as an operation of the will but as a voluntary operation of the understanding. The crucial malfunction of assent, which all these authors recognize, is *precipitation*, a violation of the firm movement of a constant mind, and the fruit of *intemperance*.⁶² Glanvill inscribes this core malfunction in a larger picture of the distempered mind, informed by a mitigated Augustinian anthropology, again like Bacon and the English treatises of the passions, but unlike Descartes. One element of this larger picture is the explanation of "precipitation" (alternately called "forwardness," "haste," or "rashness") in terms of a pre-/postlapsarian scenario (that is actually a blend of Aristotelian, Platonic, and Christian notions). The mind's "forwardness" is, Glanvill explains, a malfunction of an originally healthy condition of the human mind. Everything aspires to its own perfection; the perfection of a faculty lies in its union with its object; the perfecting object of the understanding is truth; thus, the understanding "with all the impatience, which accompanies strong desire, breaths after its enjoyment."⁶³ But ours is a fallen mind, which can no longer discern truth. We still possess the propensity to truth but are no longer capable of seeing immediately where it lies. Thus, the human mind, "naturally amorous of, and impatient for *Truth*, and yet averse to, and almost incapacitated for, that diligent and painful search, which is necessary to its discovery," is prone to give assent to any false notion without taking the time to question it: "Thus we see the inconsiderate vulgar, prostrating their assent to every shallow appearance."⁶⁴

These are exactly the terms Walter Charleton used in his *Physiologia* to describe what he, too, considered to be the main cause of erroneous judgment, "the *Impatience, Praecipitancy, or Inconsiderateness* of the Mind" giving hasty approbation to unexamined notions. Faced with a merely plausible explanation, we "greedily embrace it, and without further pre-pension [trial] of its solidity and verity, immediately judge it to be true, and thus set up our rest therein." This condition of the mind, Charleton proposes, is due to the "insatiable Appetence of Knowledge," which is a consequence of Adam's Fall.⁶⁵ Let us recall that an explanation of hasty assent in terms of "greed" or pursuit of "self-satisfaction" in a mind desirous of rest was involved not only in Bacon's examination of the idols of the mind but also in Galen's analysis of error, although neither of them

traced it to the Fall (for obvious reasons in Galen's case). Apart from the biblical story, therefore, the critical element in these accounts is the construal of assent as a hybrid cognitive-desirative operation of the mind (in contrast with both Descartes's will-assent and the early Stoic entirely cognitive assent).

The other element in Glanvill's larger picture enriches the notion of assent with its passionate and moral dimensions. The reason why the affections have such a powerful hold on our understandings is that we are caught in a circle of reflected self-love: since love unites the object of interest to the soul, we become amorously attached to our ideas and they become "but *our selves* in another *Name*": "For every man is naturally a *Narcissus*, and each *passion* in us, no other but *self-love* sweetened by milder Epithets. We can love nothing, but what is agreeable to us; and our desire of what is so, hath its first inducement from within us."⁶⁶ This is perhaps the most serious failing: what at one level is simply an error of judgment is at bottom the grievous moral failure of remaining a prisoner to the perspective of one's private self, and being unable to embrace the perspective of the whole. Glanvill says as much later on, rehearsing the Baconian conjunction of pride and partiality: "Our demonstrations are levied upon Principles of our own, not universal Nature: And, as my Lord Bacon notes, we judge from the *Analogy* of our selves, not the *Universe*."⁶⁷

The association of precipitation (as the core malady of assent) and self-love or vanity features in other places as well. In the Port Royal *Logique* the authors explain that fallacious judgment is mostly due to precipitation described in Cartesian terms: men "judge rashly of what they only know obscurely and confusedly." This "miscarriage," the authors add, this time not in Cartesian but in Augustinian terms, is largely due to men's "Vanity and Presumption."⁶⁸ A similar picture is offered by Thomas Sprat in the manner of a graphic sketch of the gradual activation of the intemperance of judgment fueled by vanity to which a philosopher can fall prey. The character is in principle a "sincere and invincible Observer," who is nevertheless incapable of maintaining a steady course of inquiry. He is seduced by his own preliminary judgment upon the matter under investigation (equivalent to what Bacon called the anticipations of the intellect), finds "more and more proofs to confirm his *judgment*," becomes "warmer in his *imagination*," and with "presumption" rushes into self-gratifying conclusions. The purpose of the little sketch is to show "by how many *plausible degrees*, the wisest men are apt to deceive themselves, into a *sudden confidence* of the certainty of their knowledge." This sudden confidence has all the characteristics of a passion, and a violent one at that. It is the outgrowth of a mind that has fallen into a

state jointly characterized by intemperate judgment, warm passion, and presumption.⁶⁹

For Glanvill, the emblematic phrase that captures this miscarriage of the mind is one that Reynolds also quoted: *facile credimus quod volumus*. Beliefs are at the same time wishes and loves of a mind enamored with itself: our “beloved Opinion being thus wedded to the *Intellect*, the case of our *espoused self* becomes our own,” to the ruin of (moral and intellectual) justice.⁷⁰ Glanvill enlarges upon the effect of love on the understanding in a list that rehearses some of Bacon’s sources of idols: opinions grounded in our natural constitutions, owing to custom and education, to interest, and to our affection for our own inventions (“we love the issues of our *Brains*”)⁷¹ are all presented as forms of self-love. Our reverence for antiquity and worship of authority (a “pedantick Adoration”)⁷² are the main forms taken by our love for others.

The Baconian idols also play a foundational role in Robert Hooke’s posthumously published *General Scheme or Idea of the Present State of Natural Philosophy* (1705), where his stated aim is to give “the true method of building a solid philosophy” or a “Philosophical Algebra.” To that end, he first describes “the manner of preparing the Mind, and Furnishing it with Materials to work on,” which he takes as the necessary preparative groundwork for the second part, the “algebra” itself (which he actually never wrote).⁷³ As a first step in the preparation of the mind, Hooke engages in a discussion of the “Constitution and Powers of the soul,” of which a significant part is taken up with presenting the imperfections of the soul. His list is composed (in a transparently Baconian fashion) of imperfections due to human nature (especially the defective senses), imperfections arising “from every man’s own peculiar Structure” (some are inclined to speculation, others to experimentation, some “fancy novelty,” others are addicted to “chymical or mechanical operations,” and each philosopher has his own preferred subject by affinity to his peculiar constitution), and imperfections due to education and custom, which are so many forms of “prejudices,” either already acquired or lying in store for us in the future.

“Prejudices,” “prepossessions,” “preoccupations” are equivalent terms that in these texts stand for results of a flawed conduct of the understanding. Coupled with “credulity” and “obstinacy,” they are the main ingredients of the archenemy of the new philosophy, dogmatism. Once placed in the context of the analysis of the mind’s distempers, dogmatism is interpreted as itself a “disease” or a vice of the mind. For Glanvill, it is a product of “shallow unimprov’d intellects.”⁷⁴ The mechanism responsible for it is the same conjoined action of precipitation and self-love

that breeds the majority of errors: "'Tis *Pride*, and *Presumption* of ones self that causeth such forwardness and assurance." Above all, dogmatism rests in a failure of self-government: "For one of the first Rules in the *Art of Self-Government* is, to be *modest* in Opinions: And *this Wisdom* makes Men *considerate* and *wary*, distrustful of their own Powers, and jealous of their Thoughts."⁷⁵

Let us note that the critique of credulity and dogmatism is often one member of a double attack that also includes a critique of radical skepticism. Thus, for instance, in the *Logique*, precipitation and presumption account for the vice of those "who decide and determine all things." But there is also a contrary vice, of those who maintain that nothing is certain. The former are the dogmatists, the latter the "Pyrronists."⁷⁶ Pyrrhonian skepticism is also presented as a malady of assent joined by irregular desire: its supporters "place their whole delight in doubting all things . . . by which means they fall into a voluntary suspense and wavering." Both are called "Irregularities of the Understanding," and in both cases the "Remedy" lies in "rectifying our Judgments and our Thoughts, with mature and studious Deliberation."⁷⁷

Similarly, Sprat elaborates on the dangers that can sway the inquirer to the opposite poles of dogmatism and skepticism by the ill management of the operation of judgment. The "first Danger" lies in "an *over-hasty*, and *precipitant* concluding upon the *Causes*, before the *Effects* have been enough search'd into: a finishing the *roof*, before the *foundation* has been well laid."⁷⁸ The "second Mischief" comes with the other extreme: "an eternal *instability*, and *aversion* from assigning of any [cause]. This arises from a violent, and imprudent hast to avoid the first."⁷⁹ Sprat concludes on the delicate business of steering a middle course between the Scylla and Charybdis of dogmatism and skepticism: "So easie is the passage from one extreme to another; and so *hard* it is, to stop in that little point, wherein the right does consist."⁸⁰ For Sprat, dogmatism and skepticism are types of epistemic behavior due to an ill-regulated rhythm of the mind's assent: in different ways, they are both the result of a certain "haste" or "precipitancy" in forming judgments.

The idols and diseases of the mind in the English virtuosi's texts are therefore treated as mental phenomena that do not permit a dichotomization of the cognitive and the affective or of the epistemological and the moral. They are, moreover, the background against which accounts of the experimental method of inquiry are formulated. As a consequence, inquiry is itself understood as a method with a similarly complex cognitive, affective, and moral outcome. As a preliminary to the discussion of

the method of inquiry as rooted in a regimen perspective, I want to look at one of its defining features: epistemic modesty.

Epistemic modesty

The developments in early modern English philosophical thought toward a legitimation of a modest epistemological position that gave up the quest for infallibly certain knowledge (or for an Aristotelian *scientia*) have been documented in a number of important studies.⁸¹ If, for these authors, a high level of certainty was still preserved for mathematics and sometimes metaphysics (while absolutely infallible certainty was increasingly reserved for God alone), everything else fell into various levels of certainty and of probability, arranged in new cartographies of kinds and degrees of knowledge, and associated with new standards of well-founded belief.

One influential explanation of this development is Richard Popkin's account of the early modern "skeptical crisis," a European intellectual crisis fueled by the Reformation and the revival of Greek skepticism in the sixteenth century. Common to both, Popkin explains, was a basic epistemological problem: the criterion of truth or the problem of justifying a standard of true knowledge. The various philosophical solutions to this problem included the Cartesian type of "quest for certainty," but also, in other quarters, the "quest for faith" (the fideist position) and the "quest for reasonableness" (the "mitigated skeptical" position).⁸² The latter was represented by a theory that "could accept the full force of the sceptical attack on the possibility of human knowledge, in the sense of necessary truths about the nature of reality, and yet allow for the possibility of knowledge in a lesser sense, as convincing or probable truths about appearances."⁸³ This was, Popkin argues, the position embraced and developed by the advocates of the new experimental philosophy: Gassendi and Mersenne in France; Wilkins, Glanvill, Boyle, and Locke in England.

In the case of the English virtuosi, a number of scholars have argued that the major source for their epistemological position was the theological epistemology and methodology developed by the Anglican Reformers: the latter's doctrinal minimalism, irenicism, and epistemological prudence (epitomized in their category of "moral certainty"), embraced as the safest way to salvation amid theological controversies, spelled out a platform of mitigated skepticism, probabilism, and fallibilism, which

the virtuosi took over for their own purposes in devising the epistemology and methodology of their “new philosophy.” Barbara Shapiro calls the result of this development, nourished by the revivals of skepticism and of Augustinianism, a new English cultural “style” that permeated not only natural philosophy and theology but also history, law, and literary thought. She takes this style as the bedrock of several important emphases of the early Royal Society: cooperative work, tentativeness and modesty in evaluating scientific findings, a nondogmatic style of discussion and presentation.⁸⁴

An alternative account of cultural influences has been suggested by Steven Shapin, who sees English epistemic modesty as a cultural repertoire that was transferred into the scientific milieu of the Royal Society from the larger gentlemanly culture of the time, and that represented a response to problems that should be analyzed simultaneously as epistemic and social. The gentlemanly truth-telling practices, Shapin argues, were construed as a guarantee of both credibility and social order, since they involved such order-preserving features as trust, decorum, prudence, and tolerance, as well as a “judicious skepticism about the quality of knowledge and a temperate probabilism about its certainty.”⁸⁵ Such discursive and social features were relocated to the scientific culture of the early Royal Society and shaped the virtuosi’s procedures for assessing testimony and for managing assent.

While recognizing the pervasiveness of the themes of skepticism, probabilism, and collective endeavor in the English experimental philosophy, Peter Harrison has offered yet another angle on the early modern problem of knowledge: at bottom, he argues, this problem needs to be seen as rooted in a theological anthropology. In particular, Harrison argues for the centrality of the story of the biblical Fall and of the epistemic and moral consequences of the original sin in all early modern theories of knowledge, be they “experimental,” “speculative,” or “illuminative.”⁸⁶ An assessment of the postlapsarian state of the human faculties was the cornerstone of statements about the possibility and extent of human knowledge. In the case of English experimentalism, the powerful influence of a Protestant Augustinian anthropology resulted in pessimistic assessments of the capacities of the human faculties, which in turn led to an idea of the modest prospects of epistemic achievements and to a construal of scientific method as a set of procedures that could secure dependable probable knowledge at a social, cooperative level. Scientific method actually belonged to a series of coercive external regimens that could placate individual corruption, a series that also included methods of education or the social-ordering activities of the state.⁸⁷

In summary, these approaches in the history of epistemology construct the English theme of epistemic modesty in the seventeenth century as (a) a response to a uniquely epistemological problem, in fact, to what has been taken as *the* epistemological problem of modern philosophy, the justification of knowledge (Popkin); (b) a chapter in the cultural history of knowledge, which still construes the problem as fundamentally epistemological, but analyzes the transfer of approaches from theology (or law, or history) into natural philosophical discourse (Shapiro); (c) a chapter in the social history of knowledge, for which the epistemological problem is at the same time a problem of social order, informed by social discourses or repertoires (Shapin); (d) an outgrowth of an underlying problematic, the assessment of the capacities of human nature and the human faculties from the perspective of a theological anthropology (Harrison).

The suggestion of my investigation so far has been that English experimental natural philosophy absorbs the *cultura animi* conception of the diagnosis and cure of the mind. I have argued that this is a valid perspective on Bacon's philosophical program, and that the general frame of this conception is present in some of the Royal Society virtuosi's writings. I am going to show in more detail below how this conception is worked out in the latter's case. It is therefore clear that I want to argue for the central role of the assessment of the human faculties in the English experimental natural philosophers' approach to knowledge. I therefore concur with Harrison's position on the role of anthropology in the problem of knowledge: the question of the limits of reason and knowledge was indeed frequently couched at the time in terms of an evaluation of the human faculties. As such, it exceeds the epistemological framework proposed by Popkin and enriched by the analyses of cultural transfer. Where I depart from Harrison's reconstruction, though, is in my understanding of the consequences of the anthropological perspective. In the texts I analyze here, the anthropological evaluation is of what I called the mitigated Augustinian sort, which, although harsh in diagnosing the failings of the mind, is nevertheless associated with a program of cure and cultivation. Against this background, the experimental inquiry into nature appears not as a coercive external method but rather as a cultivating regimen assisting the mind in its search for truth. The fallibilist, probabilist epistemology of the English experimentalists is an expression of such a stance, which is indeed governed by an awareness of human frailty but also sanctions a dynamic view of the progress of the mind in knowledge pursuits—a view that is not recognized by the epistemological approaches and is denied by the strict Augustinian-anthropological perspective. To recall the example of the Bensalemite divines in Glanvill's

sequel to the *New Atlantis*, their epistemic modesty is not simply a consequence of, but actually an active response to, human frailty. It is not a picture of what man can reasonably expect from his epistemic endeavors given his limits, but rather an exercise of sifting truth from error by renewed interrogation that is expected to *cure* the mind's frailties as much as is humanly possible. Wary inquiry is granted here, as in Athanasius's case in Charleton's consolation dialogue, the role of a "physic" capable of removing prejudices and preoccupations, of calming the passions and composing the agitation of the mind.

The social dimensions of epistemic modesty may also fruitfully be seen as expressions of a culture of regimens. That social dissension was a problem to which the Royal Society virtuosi responded in their philosophical (and religious) thought is undeniable. "Dogmatism" was a term that for them designated unwarranted claims to infallibility in both philosophy and religion (as typified by speculative philosophy and enthusiastic religion) and that they took as the prime cause of social unrest.⁸⁸ Thus, for instance, Glanvill in his *Vanity of Dogmatizing* holds dogmatism responsible for "ill manners, and immodesty" in civil life and calls it a "great disturber both of ourselves and of the world without us." Similarly, the Bensalemite divines' epistemic modesty was a response to the problems of the wars of enthusiasm. But it is important to see that this evaluation of dogmatism is part of a larger account that argues that dogmatism is actually a "disease of the mind," one of the species of distempers that Glanvill charts throughout one third of his book. Dogmatism is the fruit of ignorance (in the sense of a misevaluation of ourselves, resulting in presumption about our capacities); such ignorance belongs to "shallow passive intellects, that were never engag'd in a through search of verity" and do not realize that their notions (spun out of their own heads) do not discover the truth of things. Dogmatism is also the fruit of a mind devastated by passions and other distempers: it "dwells with untamed passions, and is maintain'd upon the depraved obstinacy of an ungovern'd spirit"; it makes one a prisoner of his own "chains of errors," incapable of escaping his own private perspective; and it betrays "a poverty and narrowness of spirit" that is the direct opposite of the liberty of judgment of a "generous soul."⁸⁹ Thus understood, the problem of social order is to a large extent seen as an outcrop of the problem of the order of the mind. Dogmatism appears here as a moral and intellectual failure of a mind incapable of a just estimation of itself and of its relation to the truth of things, as well as of a mind fallen prey to disturbing passions and to a private, narrow perspective. This dimension of the early modern English discussion of dogmatism can be acknowledged, I propose, if we

shift the historiographic perspective from isolated epistemology or from cultural styles and social codes onto questions about doctrines of mind and its regimens. From this angle, the critique of dogmatism is primarily the castigation of what is conceived as a bad use of one's capacities, and features as a preliminary to pointing the right way toward the cultivation and improvement of one's mind. Epistemic modesty is indeed an attitude of opting for prudent inquiry rather than positive assertion, for the probable rather than for the infallibly certain: but the option is validated by its being, on this account, the best way to "teach Men the right use of their Faculties."⁹⁰

The Royal Society virtuosi describe natural philosophical inquiry as governed by the double purpose of the search for truth about the natural world and of the training of ordered and improved minds. They work with the conceptual patterns of what I described generally as the art of the physician of the soul and argue for the special benefits of natural inquiry as contributing to that art. Their epistemic modesty, I propose, is not reducible to the concern with an epistemically acceptable science of appearances, or with the observance of codes of socially acceptable intellectual behavior. It is rather rooted in an anthropological conception of human frailties and capacities, and is also the form that, in their view, the labor of the mind should take if distempers are to be cured.

The way of inquiry

The regulation of assent and probable truth

In the essay "Of Scepticism and Certainty," Glanvill explains that the aim of philosophy is the government and cultivation of the human faculties: "'Tis the office and business of *Philosophy* to teach Men the right use of their Faculties, in order to the extending and enlarging of their Reasons." The main rule to that end is described in terms of a regulation of assent: it is "to be wary and diffident, not to be hasty in our Conclusions, or over-confident of Opinions; but to be sparing of our assent, and not to afford it but to things clearly and distinctly perceiv'd."⁹¹ The format of this rule is obviously Cartesian, and Glanvill refers in several places approvingly to Descartes's "method" for the remedy of error. Nevertheless, for Glanvill this Cartesian rule is of the same substance with the teachings of both Bacon and Gassendi on the question of the best way of natural inquiry. He names the three philosophers as the worthy predecessors of the method of the Royal Society, who understood that the search

for truth in nature should proceed with “wariness and circumspection” and that opinions should be proposed “as *Hypotheses*, that may *probably* be the true accounts, without peremptorily affirming that *they are*.”⁹² Now, this picture does suit Gassendi’s views about conjectural reasoning and probable results in inquiry,⁹³ but it seems to misrepresent Bacon’s and Descartes’s. There is nevertheless something to be said in favor of Glanvill’s syncretism. For Bacon, the end result of the experimental investigation should be certainty, yet he warns that the path leading to it is longer than anyone could tread in a lifetime. He speaks of the lower degrees of certainty of the intermediary results and warns that embracing these as final and terminating inquiry is a fatal mistake (and the sign of distemper). Descartes also finds a place for the less than absolutely certain in his epistemic scheme relative to natural philosophical inquiry. While metaphysical principles are such as to meet the criterion of the clear and distinct, those physical principles that cannot be directly derived from them are hypothetical and “morally” rather than “mathematically” certain.⁹⁴ The category of “moral certainty” actually became prominent in the work of the empiricist Cartesians who, Roger Ariew explains, eroded the distinction between absolute and moral certainty mainly owing to their discarding of Descartes’s method of hyperbolic doubt.⁹⁵

We should note here that Descartes’s rule for regulating assent is explicitly formulated only within the context of his method of *hyperbolic doubt*: nothing will be assented to, Descartes resolves, but what is clear and distinct and thus can acquire the status of absolute certainty. In Glanvill’s hands, however, the “clear and distinct” seems to fuse the Cartesian and the Gassendist vocabulary, and to point to a method of *wariness and circumspection* rather than one of hyperbolic doubt. Moreover, Glanvill reinterprets the Cartesian regulation of assent in terms of those developments in the *cultura animi* literature which inscribed Stoic assent into an Academic skeptical framing of the discipline of judgment. With this move, the regulation of assent is relocated in the domain of the less than absolutely certain, and is interpreted as a prudent, long-term fight with the whole array of distempers analyzed in the Augustinian-Socratic anatomies of the mind (in contrast with Descartes’s once-in-a-lifetime course of hyperbolic doubt).⁹⁶ In a similar way, John Wilkins takes care to say that “moral certainty” will win the “consent” of “every man whose judgment is *free from prejudice*” (emphasis mine),⁹⁷ and emphasizes the “labor” that the understanding is required to perform in assenting to nonevident things, a work liable to moral evaluation: “Things that are not manifested to the senses, are not assented unto without some labour of the minde,

some travaile and discourse of the understanding; and many lazie soules had rather quietly repose themselves in an easie error, than take paines to search out the truth."⁹⁸

The search for truth is indeed the orienting task of the virtuosi's endeavor, but, in keeping with epistemic modesty, they will say that discovered truths should be held as only "probable," or as "hypotheses" that might well be revised with further inquiry. A probable truth nevertheless is not a mere "probability," Glanvill warns. He wants to maintain a distinction between a probable truth plausibly confirmed and capable of revision, and a category of epistemic products labeled "probabilities," "opinions," or "verisimilitudes." The distinction is made in conformity with the requirement of a wary regulation of assent that is at the same time seen as a method of purging and fortifying the mind. In our post-lapsarian state, Glanvill says, we are surrounded by "such a multitude, such an Infinite of *uncertain opinions*, bare *probabilities*, specious *falsehoods*, spreading themselves before us, and soliciting our belief." We are, moreover, both "greedy of *Truth*" and "unable to discern it," so that "it cannot be, that we should reach it any otherwise, then by the most close *meditation* and engagement of our minds; by which we must endeavour to estrange our assent from every thing, which is not clearly, and distinctly evidenc'd to our *faculties*."⁹⁹ Echoing the Baconian "subtlety" of the labyrinth of nature, Glanvill says that truth lies deep, is mixed with falsity, and is "relative" (i.e., truths are linked in a chain and thus dependent on one another, so that to know one means to be able to know all).¹⁰⁰ Consequently truth can be sought after only with a labor of the mind that must remain, on the one hand, tentative in its conclusions and, on the other, constantly aware of the disruptive inclinations of the mind. Without labor, the mind acquires "opinions" and "verisimilitudes": "*Verisimilitude* and *Opinion* are an easie purchase; and these counterfeits are all the Vulgars treasure: But true Knowledge is as dear in acquisition, as rare in possession."¹⁰¹

"Opinion" here bears a strong echo of the shapes of the same term in the *cultura animi* texts. It is not simply an epistemic category but also the mark of a specific state of the mind.¹⁰² For Glanvill, truth (even if in the guise of what is probable) can be attained only by an attentive, discriminating mind, while opinion is the harvest of the superficial, irregular mind. The positing of a degree of certainty (the highest) that may well remain forever outside human reach seems to reinforce, rather than weaken, the moral and intellectual task of clearing and improving the mind. This task, moreover, is explicitly formulated in terms not of

remaining content in computing probabilities but of pursuing the search for truth, even if in the guise of the less than infallibly certain: "*Truth is not to be attained, without much close and severe Inquiry. . . . It requires much Care, and nice Observation to extract and separate the precious Oar from so much vile Mixture; so that the Understanding must be patient, and wary, and thoughtful in seeking Truth.*"¹⁰³

Therapeutic skepticism and constancy

The virtuosi's perspective on human nature and the search for truth performs a reinterpretation of the epistemic categories of the certain and the probable in *cultura animi* terms. Once the inquiry into nature is placed in the context of the anatomy and cure of the mind, epistemic modesty acquires the double status of an expectation proportionate to the acknowledgment of the limits of human nature (the proper self-knowledge in view of an anthropology of human frailty) and of an active task of regulating the mind's operations. Engaging in the labor of patient search and wary discrimination between truths and falsehoods requires the self-denying recognition that the truth of nature cannot be definitively captured in a theoretical system—a notion sanctioned by the related views that human capacities are limited and that nature's complexity far exceeds those capacities (truth "lies deep," and nature is a labyrinth or a divine fabric of concatenated elements whose totality escapes the human grasp).¹⁰⁴ Consequently, the results of inquiry should be held as only "probable" (provisional) and the search continuously resumed. For the virtuosi, this antisystemic epistemological position is explained by reference to the distempered inclinations that they analyze in their anatomies of the idols and diseases of the mind. System construction is the fruit of a "dogmatic" or "speculative" tendency that is actually geared by an ungoverned, impatient mind. An experimental inquiry, they argue, has the benefit of tempering such a tendency, and as a consequence, the skepticism that they warn should accompany natural inquiry is presented as having therapeutic effects. This is to say that the virtuosi explore within the context of natural philosophical research the same association of the virtues of (skeptical) inquiry, (Stoic) constancy, and (Christian) humility that was developed in some of the *cultura animi* texts. I propose therefore that mitigated skepticism is valorized in their case as an operator of a discipline of judgment, and thus as a practical instrument of the regimen of the mind.

Thus, for instance, in the essay "Of Scepticism and Certainty," Glan-

vill defends experimental philosophy against the accusation of “skepticism.” He turns the presumed vice into a virtue by explaining that, rightly understood, skepticism is the attitude of honest search par excellence. In contrast with the “pretended Philosophy” of the Pyrrhonian skeptics, such modern skeptics as the Royal Society fellows, as well as their forefathers Cicero and the Middle Academy, are truly called “seekers,” and not “assertors.”¹⁰⁵ Such skepticism is the right way of inquiry and the best course of fortifying the mind against its distempers. The (skeptical) regulation of assent that it warrants has the power to breed a set of (Stoic) virtues of the mind (firmness, constancy, freedom from fancy and humor):

[I]f a Man proportion the degree of his Assent to the degree of Evidence, being more sparing and reserv'd to the more difficult and not thoroughly examin'd Theories, and confident only of those that are distinctly and clearly apprehended; he stands upon a firm bottom, and is not mov'd by the winds of Fancy and Humour, which blow up and down the conceited Dogmatists: For the Assent that is difficultly obtain'd, and sparingly bestow'd, is better establish'd and fixt than that which hath been easie and precipitant.¹⁰⁶

Such a discipline of assent is for Glanvill a true art of self-government (an “Art of Autocracy”), whose main instrument is right judgment (governed by the “hegemonical power”): note that Glanvill employs the Hellenistic notions with their echoes of a therapeutic philosophy. In describing the “generous soul” or the “nobler spirit” as the one who manages to rise above the Narcissus point of view and embrace the perspective of the universe, Glanvill also invokes the Stoic ideal of stability and constancy.¹⁰⁷

Sprat’s portrait of the experimental philosopher in his *History* is drawn in a similar manner. The experimental way keeps a middle course between “dogmatism” and “speculative skepticism,” which we have seen are described by Sprat in terms of disturbed assent. That middle course is represented by a skepticism that allows “the advantage of probability to one Opinion, or Cause, above another,” but in such a way that further explorations may follow and “speculation” may be deferred “till the matters be ripe for it; and not by madly rushing upon it in the very beginning.”¹⁰⁸ The collections of natural experimental histories enriched by directions and questions for further inquiry are the proper method of providing enough material for such a later theorizing moment, in contrast with the dogmatic (scholastic) way of “striving to reduce the *Sciences*, in their beginnings, into Method, and Shape, and Beauty.”¹⁰⁹ The

Baconian substance of these statements is clear. Sprat takes over from Bacon both the promise of a future *science* that lies at the far end of the road and the insistence on the tentativeness of inquiry and the need to avoid search-arresting “speculation” while along the road. Again like Bacon, Sprat suggests that speculative theories thrive on distempers. They rest on “two very dangerous Mischiefs,” which are presented as inclinations of the mind. The first is the inclination to stop inquiry and become satisfied with preliminary results, an error “which is very natural to mens minds”: the mind longs to rest and finds it difficult “to be long in suspence.” These are exactly the terms in which Bacon interpreted syllogistic reasoning (and Reynolds, the need of the mind to have “something to rest it selfe upon”). The second is the propensity toward obstinacy, imperiousness in opinions, and contradiction, which constitute “a Temper of the mind, of all others the most pernicious,” in opposition with the “calmness, and unpassionate evenness of the true Philosophical Spirit.”¹¹⁰

The opposition between “experimental” and “speculative” philosophy in the second half of the seventeenth century was indeed, as Peter Anstey has argued, the most prominent methodological opposition, often put forward by the English virtuosi for polemical purposes.¹¹¹ But in view of the framing of this opposition in terms of the “temper of the mind” associated with each of these alternatives, it is apparent that it also included a *cultura animi* perspective. For Sprat, the experimental way of inquiry can *cure* the mind of “romantic swelling” and the “perversity” of peremptory conclusions, while also resulting in observations that have the benefit of “supply[ing] for the wants of human life,” in conformity with the double understanding of the “usefulness” of experimental natural philosophy.¹¹²

The conception of a therapeutic use of skepticism is also present in Hooke’s *General Scheme*. The way in which Hooke conceived of the compilation of natural histories as both the groundwork of philosophy and the best remedy for the faculty of memory has been expounded in a couple of important articles by Lotte Mulligan.¹¹³ Less attention has been paid, however, to the way in which Hooke’s transparently Baconian chart of the “imperfections of the soul” includes references to a *discipline of judgment* with remedial capacities. Countering those imperfections are a series of prescriptions for the good conduct of the mind in inquiry. Thus, for instance, Hooke recommends an exercise in flexibility meant to shed obstinacy (“to accustom oneself to a contrary supposal or practice”), as well as an exercise in regulating judgment by trial of arguments and circumspection as to one’s preferences, which should lead to acquiring a

habit “not to receive any Notion for certain till thoroughly confirm’d by very Cogent Arguments and Ratiocinations, and always to suspect that which seems most consonant and pleasing to our Inclination.”¹¹⁴ Most important, he advocates a general regulation of assent that he calls “an Hypothetical Scepticism, whereby to impose upon our selves a Disbelief of every thing whatsoever, that we have already imbraced or taken in as a Truth.”¹¹⁵ For Hooke, this is a description of an “Art for Inquiry” that does not nevertheless sanction skepticism about its final results, since “my Design . . . supposes all things as possible to be known.”¹¹⁶ Hooke’s prescriptions for the conduct of the intellect in inquiry are echoed in his exemplary portrait of the “natural historian,” an inquirer capable of “the greatest Degree of Candor and Freedom from Prejudice”¹¹⁷ and devoted to the cause of truth rather than to that of his own self. Prejudice can be countered owing to the fact that “by discovering experimentally the Errors in this or that Hypothesis, [the mind] will be much easier taken off from adhering to any, and so enjoy a greater Freedom of perceiving and imbracing Truth from what occasion soever it be offered.”¹¹⁸

That the “freedom” of the mind acquired by the skeptical discipline of judgment is a virtuous disposition is also signaled by a specific use of the term “indifference” in the virtuosi’s texts. The meaning of the term in the discussions of the freedom of choice (cf. Descartes’s “freedom of indifference”) was that of lack of determination. But in our texts “indifference” translates as lack of enslavement to passions, vanities, and other distempered inclinations of the mind and is held as the required attitude of the seeker after truth, whose sole aim and desire is the finding of truth rather than any other corrupt end of knowledge. Charleton uses the term in this sense when he has Athanasius describe his own distaste for “passionate Altercations” and love for honest inquiry, which he pursued “with perfect Indifferency to either side,” that is, not caring whether it is himself or his opponent that is proved right.¹¹⁹ Wilkins emphasizes the difficulty of the indifferent attitude thus understood: “’Tis very difficult for any one, in the search of Truth, to find in himselfe such an indifferencie, as that his judgement is not all swayd by an overweening affection unto that which is proper unto himselfe.”¹²⁰

The virtuosi’s refashioning of natural philosophical inquiry in *cultura animi* terms translates epistemological moderate skepticism into a therapeutic instrument that directs the mind in rightful inquiry. This Socratic type of skepticism (Glanvill calls it Socratic modesty)¹²¹ asks for a constant revision of judgment accompanied by the effort of self-knowledge, and is taken to build such virtuous dispositions of the mind as constancy

and freedom from enslaving distempers, while at the same time allowing for a growth of true (if only probably true) knowledge about the natural world.

A “union of eyes and hands”: The community and objectivity revisited

The value of the assembly

English experimental natural philosophy valued the gathering of “particulars,” often described as “facts.” The significance of “facts” or “matters of fact” as conceptual constituents of English natural philosophy in the seventeenth century has been illuminated in important scholarly studies.¹²² According to Shapin and Schaffer’s social historical line of investigation into this topic, the discourse of facts was not only a solution to questions about legitimate knowledge and scientific method but also a response to questions about the legitimate philosophical “form of life,” with consequences for the conception of the appropriate manner of life in the polity. Central to this form of life was the collective nature of the experimental practice, which presupposed a number of rules of discourse and of assessment of knowledge claims that could guarantee the consensus and produce the trustworthiness required for the establishment of matters of fact as the foundation of legitimate knowledge. The cognitive gains were thus premised on a moral integrity of the experimental form of life, which played a crucial role in its validation in face of other, competing models of natural philosophical pursuits.¹²³

I would like to suggest that the value of the community in the early modern experimental philosophical perspective is richer than what can be said about it on the social-historical approach. While the significance of this feature as the mold of a new form of life characteristic of the modern scientific ethos is undeniable, the *cultura animi* framework in which I argue it was developed makes it also, and more fundamentally, a way of life, with the set of connotations derived from the tradition of philosophy as a cure and cultivation of the mind. The defense of the value of the community, or the “assembly,” as Sprat calls it, of the natural philosophers looks not only at the way it establishes trustworthiness and reaches consensus, but also at the role it has in the discipline of judgment and thus in helping the individual’s progress against the idols of his mind. In this respect, the assembly takes on the monitoring role of the “wise and discreet friends” in the *cultura animi* texts, and its moral integrity

rests not only on collective values but also on individual virtues which are, indeed, acquired with the help of the community and recognized as valuable at the communal level.

Thus, when Hooke deals with the imperfections of the soul arising from every man's peculiar constitution (an equivalent of Bacon's idols of the cave), he accompanies his recommendations for a discipline of self-examination and of wary trial of the notions one forms with the observation that individual effort has greater chances of success if assisted by the monitoring of those around: "So though the reason should be satisfied, and the Phant'sy full of the Truth of this or that Opinion, another Mind otherwise qualified, may find many Flaws and Errors in it, and perceive many things to have proceeded from Prejudice."¹²⁴ The wiser "minds," Hooke believes, can help the individual look at himself from outside the cave, as it were, and thus guard him against the self-loving tendency to remain satisfied with partially examined opinions. The freedom from prejudice that Hooke called "candor" is not only a feature of the philosophical style involved in the establishment of experimental results that everyone can accept at the level of the community, but also a feature of individual minds extracted from their private cells (Bacon's "measure of the individual" or Glanvill's Narcissus perspective) with the help of the community.

The same view is elaborated at length in Sprat's *History*. The Baconian "union of eyes and hands" provided by the assembly of natural philosophers is "an excellent cure," Sprat says, for the weariness and negligence that unavoidably threaten any researcher who undertakes a work of inquiry alone. The "mingling of Tempers" in a community has the effect of balancing individual humors.¹²⁵ True inquiry, i.e., the inquiry that recognizes the necessary tentativeness of results and the need for renewed effort, is best served by collaborative rather than individual work precisely because it makes possible the government and regulation of the mind's tendencies that this type of inquiry depends on. This is one reason, for instance, why Descartes's "philosophical method" cannot really be successful. Unlike Granvill, Sprat refers here not to Descartes's regulation of assent as a remedy for error (which he, too, could only approve given his considerations on the matter a few pages on), but to his contemplative, speculative method whereby he "wholly gave himself over to a reflexion on the naked *Ideas* of his own mind." When it comes to natural inquiry (as opposed to metaphysical contemplation), such a course can generate only "narrow and obscure" apprehensions that remain "peculiar" to the individual mind. It is wiser therefore to "measure or strengthen [one's thoughts] by the assistance of others."¹²⁶ The philosopher gradually

falling into a “sudden confidence” about his theory in Sprat’s sketch I presented above was actually a philosopher choosing to retreat alone to his study, and the sketch was part of Sprat’s defense of the value of the assembly against the dangers of dogmatism.

Being exposed to a multitude of opinions, Sprat thinks, does not by itself breed prejudices, but on the contrary invites you not to become obstinately attached to any. Similarly, for Hooke, the natural historian needs to be not only a skilled discriminator of sense information and opinions but also versed in theories and systems of philosophy, to be able to “understand their several Hypotheses, Suppositions, Collections, Observations, &c. their various ways of Ratiocinations and Proceedings.” This practice should not breed credulity and prepossessions if it is used in order to formulate “queries,” or lines of investigation, and to propose provisional “conjectures.”¹²⁷ For Sprat, as for Hooke, prejudice arises only when you become “addicted” to this or that opinion.¹²⁸ One role of the community is to keep you safe from such addiction. But more than that, Sprat resorts to a rather strange Baconian explanation of the power of the assembly. In *Sylva Sylvarum*, Century X, Bacon noted that the passions of men are more intense in companies than they would be in solitude. It is as if, Sprat comments, the mind of one man would be “posess’d with the *Souls* of the whole multitude, before whom they stand.” The same phenomenon, he proposes, may also occur as far as the other operations of the mind are concerned, including those of the understanding: “In *Assemblies*, the *Wits* of most men are *sharper*, their *Apprehensions* *readier*, their *Thoughts* *fuller*, than in their *Closets*.”¹²⁹ The Baconian conjecture about the strengthening of the powers of the mind in communities, possibly by some sort of communication of spirits, becomes in Sprat a version of the idea of the assistance provided by the scrutiny of many minds to the individual’s self-government.

It is also as a remedy for the mismanagement of the mind that “conjecturing and debating on the consequences of the experiments” need to be done by the assembly, and not by one or two persons. Sprat explains: “there can never be found, in the breast of any particular *Philosopher*, as much wariness, and coldness of thinking, and rigorous examination; as is needfull, to a solid *assent*, and to a lasting *conclusion*, on the whole frame of *Nature*.” If one man were singlehandedly to undertake this work, he would have to possess special intellectual and moral qualities: “vastness of soul,” “impartiality of judgment,” “straightness,” and a capacity of “holding the scale even.” But, Sprat says, “that has never been seen in one man yet,”¹³⁰ although, by implication, it is precisely such qualities that may be cultivated by the assembly.

The “union of eyes and hands” of the early Royal Society of London was devised as a Baconian Solomon’s House made real. It is true that, as Daniel Garber has argued, the idea of a collective establishment of results of inquiry (or of experimental facts) was a new development that went together with the creation of a new social structure. The collaborative nature of the Royal Society’s experimental program is distinct from the concatenation of individual results of inquiry that was characteristic of Bacon’s Solomon’s House in *The New Atlantis*.¹³¹ On the other hand, though, the discipline of judgment and of self that formed part of the Baconian conception of inquiry is fully taken over by the virtuosi and, I would say, turned into one powerful legitimization of the value of the community of natural philosophers. It thus accompanies the equally Baconian conception of the collective gathering of experimental and natural histories as groundwork for a philosophy of nature.¹³² If the virtuosi develop a new awareness of the importance of the communal establishment of facts, they also exploit the role of the community in the process of self-knowledge as involved in self-reformation. They take self-knowledge, understood as a diagnosis that is critical to a cure, to be essential to the pursuit of natural knowledge itself. The idea was indeed present in Bacon as well, even if it was not explicitly linked with the experimental activity of Solomon’s House in his fable. I have suggested that one resource for the valuation of the role of the community in self-knowledge was the figure of the “wise and discreet” friends, which was shaped by the ancient ideal of philosophy as a way of life and which was promoted in the early modern age by the *cultura animi* literature (Bacon included).

Objectivity, universality, and the temper of the mind

The regulative role of the community in the development of modern experimental science is also one feature of our understanding of the notion of “objectivity.” That this notion has a history, as does the conception of the social dimension of scientific inquiry, has been the suggestion of illuminating recent scholarship on the history of objectivity, most notably in the work of Lorraine Daston and her collaborators.¹³³ The early modern period is an especially interesting moment in this history, since it was then, scholars agree, that something like the modern notion starts being shaped. The modern notion can be analyzed as a cluster of concepts that describe features of exemplary inquirers and of the methodological procedures they follow, such as impartiality, disinterestedness, detachment—in short, impersonality and thus absence of “subjectivity”—which are taken to ensure the security and dependability of

scientific results. These features are primarily construed as forms of *absence* as far as the individual is concerned: they rest on the absence of personal idiosyncrasies, subjective bias, or partisanship in individual observation or judgment. They are instead seen as *positive* values of the scientific community, which builds knowledge on the impersonal pillars of routinized procedures and universal standards: it is indeed the value of the communicability of knowledge that requires the activation of the apparatus of objectivity. It is worth noting, though, as Daston has argued, that this notion of objectivity is itself permeated by a discourse of values, which argues for an inextricable moral dimension, indeed a “moral economy,” of modern objectivity.¹³⁴ On the other hand, studies in the sociology of knowledge have shown that modern scientific communities cannot really do without the valorization of trust, personal expertise, and skills, and thus of the reliability of individuals. Steven Shapin has recently called the double value attached to the personal and the impersonal the “essential tension” of the discourse of modern science.¹³⁵

As far as the early modern period is concerned, it looks as if the scholarly assessments of the development of values such as impartiality, disinterestedness, or intellectual honesty testify precisely to this essential tension. In the various historical reconstructions, the early moderns are credited both with a defense of the personal and with a promotion of the impersonal character of natural philosophical knowledge: they appear to hold on to the trust in the personal skills and integrity of the individual inquirer, but also to forge a conception of the impersonal impartiality of inquiry.¹³⁶ “Impartiality” itself appears to be an ambivalent notion: it seems to have been developed within the fields of history and law as a norm of impersonality,¹³⁷ but it has also been argued that judicial impartiality was construed at the time as an “ethical capacity,” the fruit of an “exercise of spirit.”¹³⁸ Such wavering about early modern conceptions of “objectivity” is probably due to the weight of the classical sociological perspective, which attaches the features of objectivity to the structural level of the community.¹³⁹ In exchange, we might consider putting the individual person back into the picture. In doing so, we will still recognize intellectual honesty, lack of bias, and impartiality as the constitutive components of objectivity. But we will also see that, as far as the early moderns are concerned, these features are not reducible to impersonal values that have been codified as norms of intellectual conduct in a community and that depend on routinized procedures performed by faceless inquirers. Social value may be acknowledged while at the same time understanding these components of objectivity as personal virtues. Such an understanding becomes possible once we recognize that they are integral

parts of the virtuosi's accounts of the human mind and of regimens for its cure and cultivation.

In the previous chapter I noted the association performed in several *cultura animi* texts between the virtues of a constant mind and the quality of "universality." Bacon also thought that his natural philosophical regimen would be able to perform a crucial shift of perspective whereby the individual mind would be extricated from the hold of "pride" and "partiality" and reoriented toward the "measure of the universe." In themselves, these claims could very well be subsumed in the modern notion of objectivity, *but only if* the extrication in question amounted to an erasure of personal features. In their recent study on the history of scientific objectivity, Lorraine Daston and Peter Galison have made the stimulating suggestion that modern objectivity itself is to be understood as an epistemic virtue, since it relies on "techniques of the self," whereby a "will-centered self" wills itself into "willelessness" and thus into an erasure of subjectivity.¹⁴⁰ Nevertheless, what distinguishes the early modern perspective I am investigating here from modern objectivity, even when construed as an epistemic virtue, is precisely the absence of the notion of the erasure of the person (which will only later be defined as a will-centered self or as "subjectivity," as Daston and Galison very well note).¹⁴¹ The key process geared toward "universality" is not erasure but reorientation and transformation. The datum on which the education works is one of irregular motions of the mind that combine cognitive, emotional, and volitional aspects, which are responsible for a "narrow," "partial," "private," or "peculiar" disposition of the mind, but which cannot be reduced to a (viciously subjective) will. The education is expected to perform a transformation of this disposition, the outcome of which is an ordering and a strengthening of the mind's powers, which preserves the emotional and the volitional components by the side of the cognitive, now reoriented in a good way. The transformation is understood, moreover, in terms of a rehabilitation that stands for an incorporation of the new ways of reasoning, feeling, and willing—and is thus close to the *cultura animi* notion of a habituation into permanent traits of character. The components of "universality"—the "impartiality," the "indifference" (understood as freedom from inner enslavement), the "generosity," "largeness," "candor" or "nobility" of mind—include references to the good emotions and volitions, as well as to a rehabilitation of the "temper" of the mind, which make them unambiguously personal virtues.

Thus, in Glanvill, the remedy that experimental inquiry is expected to provide is consistent with the analysis of the mind's operations as

a complex cognitive-emotional hybrid. Glanvill believes therefore that “*that Remedy is the best and most effectual that alters the *crisis* [temper] and disposition of the mind*”¹⁴² and explains:

There are few that hold their Opinions by *Arguments* and *dry Reasonings*, but by *congruity* to the Understanding and consequently by *relish* in the Affections: So that seldom any thing cures our *intellectual* Diseases throughly but what changes *these*. This dare affirm, that the *Free, experimental Philosophy* will do to purpose by giving the Mind another *Tincture*, and introducing a *sounder Habit*, which by degrees will at last absolutely repel all the little Malignities, and settle it in a *strong and manly Temperament*, that will master and cast out *idle Dotages* and *effeminate Fears*.¹⁴³

“Congruity to the Understanding” is by the same token a “relish in the Affections.” If a distempered mind is one whose operation of assent is at the same time a cognitive operation and a movement of desire and love, the healthy “temperament” of the mind will similarly reunite cognition and affection, now rightly managed and oriented. That the talk of the temperament thus fashioned involves the idea of a transformation in the whole disposition of the mind is signaled by Glanvill’s use of the eloquent metaphor of the “tincture”: experimental philosophy is thus seen as a practice capable of instilling a virtuous, ethos-transforming habit in the mind. The habit is virtuous because it can, on this account, govern and order the operations of the mind in a stable way and because it can perform the work of extracting the inquirers from their private perspectives, which is the moral purpose of the discipline of assent.

Glanvill addresses these issues in his *Philosophia Pia* (1671), a work that argues not only for the compatibility of philosophy and religion but also for the special usefulness of experimental philosophy as a service to religion. Experimental philosophy, Glanvill argues, is apt to “enlarge” men’s minds by taking them off “from all fond adherences to their private Sentiments.” It can do that precisely because of its conception of inquiry as a self-denying discipline (i.e., as a discipline denying self-love and “private” distempers, although not the capacities of the person) that cures “narrow minds” and builds a “free, manly and generous spirit.” Such a spirit is precisely the type that true religion, Glanvill says, also cultivates. In this sense, experimental philosophy (a “Philosophy of God’s Works”) is a practice of the soul in tune with the “operative Principles of the Gospel.”¹⁴⁴ Working against “private Sentiments,” experimental study is held capable of reorienting the mind’s love toward truth and toward God as expressed in nature. It cultivates the wonder and thankfulness that come with a deep, habitual understanding of the divine power and

wisdom stamped on creation and can thus constitute a rightful “sacrifice of praise” to its author.¹⁴⁵ The framing of the experimental inquiry into nature as a natural religious exercise, which will be seen to play an important role in Boyle’s and Locke’s thought as well, is an integral element of the embedding of natural philosophy within a culture of regimens.

The features of early modern objectivity are placed by the English virtuosi in the context of the work of inquiry understood as a practice of the transformation of the “temper” of the mind. The history of objectivity, I suggest, includes a chapter about the components of “universality,” construed in the early modern period as virtues of the mind that are also socially valuable, both at the level of the philosophical community and at that of the larger polity. This type of objectivity, and the epistemic modesty, the experimentalism, and the collective nature of this philosophical practice, I have argued, are features of the virtuosi’s conception of natural philosophical inquiry that are variously indebted to the context of the analysis of the human mind in terms of distempers, therapeutic methods, and cultivating regimens. It is this context, as developed by the Baconian and virtuoso discipline, as well as by the early modern physicians of the soul, that informed the views on the rightful conduct of the mind held by Robert Boyle and John Locke. It is to them that I now turn.

Robert Boyle: Experience as *Paideia*

The limits and the “perfection” of reason

In his diatribe against the “vanity of dogmatizing,” Glanvill inserted between the account of the Fall and the thorough investigation of the “disease of our Intellectuals” a four-chapter survey of “instances of our intellectual blindness,” offered as a “curbe to confidence” and as a plea for modest Socratic “nescience.”¹ The survey includes such “unexplicable” natural philosophical puzzles as the nature of the soul, its origin, and the manner of its union with the body; the way in which the soul moves the body; the nature of the faculties of the soul; the manner in which bodies are formed; the cohesion of the parts of matter; the divisibility or indivisibility of the building blocks of matter. The list of such “unconceivables” could continue, Glanvill says, with the “Mysteries of *Motion, Gravity, Light, Colours, Vision, Sound*, and infinite such like (things obvious, yet unknown).”² Although various philosophical theories are proposed in each case, none of them is completely satisfactory, and we might well accept the fact, if immodest “confidence,” and thus “dogmatism,” is to be cured.

Glanvill probably looked back to Gassendi for his identification of the inexplicable natural things that point to the limits of human reason, but stressed the causes of man’s ignorance and error (the fallen/uncultured state of the soul) and the remedial capacities of the regulation of judgment in a manner closer to the *cultura animi* tradition investigated

so far. The same approach to the limits and the possibilities of reason is taken up in Robert Boyle's *Discourse of Things Above Reason* (1681). Originally, the theme of "things above reason" was a point of theological controversy about the competence of reason in judging matters of revelation. For Boyle, the theme served to point out parallels between theology and natural philosophy as to the types of things that may be said to transcend reason in the specific sense of being hard to understand or explain, although capable of being discovered by reason.³ There are an important number of things, Boyle notes, of which we have no or only confused ideas; for which we lack explanations as to the mode of their operation; and which to the best of our power of understanding appear contradictory. Boyle's labels for these classes of things above reason are "incomprehensible truths," "inexplicable truths," and "unsociable truths," respectively. Examples of the first class include the idea of infinity and the ideas of space, time, place, and motion. The second category covers most of the puzzles of the natural philosophy of the day: the way mind and body interact; the way the will and the understanding interact; the way memory functions; the cohesion of the parts of matter; the infinite divisibility of matter; the motion of bodies—these are things that are obviously perceived to be the case but of which we cannot give a definitive explanatory account. The third class includes things that appear contradictory to our limited vision, such as for instance the problem of the endless divisibility of a straight line, which is on a par with the theological "paradox" of the coexistence of divine foreknowledge and human free will.⁴

Jan Wojcik has explored the theological roots of Boyle's views on the limits of reason, which, she argues, were aligned with the Nonconformist stance on the issue and which "affected his conception of the proper goals and methodology of the new natural philosophy": Boyle's quest for intelligible rather than true explanations, and the provisional nature of his claims, sprang from his assumptions about the creation of man with limited powers of reason.⁵ Awareness of the centrality of the limits-of-reason theme in Boyle's thought, Wojcik argues, should lead us to conclude that "the rationality of Boyle's thought has been greatly exaggerated."⁶ In contrast with the promoters of the Restoration "rational religion," who emphasized the competence of human reason, Boyle vigorously defended a position of "diffidence" toward reason's claims. Rose-Mary Sargent's 1995 study on Boyle's philosophy, which Wojcik thus invokes, has indeed captured an essential dimension of Boyle's vision in the label "the diffident naturalist." But there is another side to Sargent's story, which, although not as resonant as the title of her work, is

equally essential to understanding Boyle's conception of reason: Sargent also speaks of the "dynamic approach to knowledge acquisition" that shaped his attitude to the study of both nature and Scripture, pursued via a "complex process of interpretation," which was at the same time a learning process.⁷ Emphasis on the limits of reason alone, I would say, suggests a static picture of Boyle's views, which does not do justice to his quest for a way of reasoning and a method of inquiry that could prove flexible enough in dealing with the truths of nature and of revelation, while remaining diffident about the definitive nature of the results.⁸ I would like to add here that Boyle's dynamic approach to knowledge is at the same time a dynamic approach to the human faculties, one that emphasizes their educability and progress conjointly with an awareness of their limits. As such, I propose, Boyle's view of the possibilities of human nature is closer to the anthropology I described in this book, which is as adamant about the limits and weaknesses of the human mind as the Nonconformists' anthropology, while at the same time allowing for an account of the work on the human faculties as the proper task of a rational, even if fallen/weak, creature.

Boyle's concern with the state and possibilities of our faculties is indeed the framework of his approach to the questions of the limits of reason and of certain knowledge. In *Things Above Reason*, he speaks of the "dependency and limitedness of our Natures" and of the "limited nature of the Intellect"⁹ but also extracts a number of important lessons from the fact. One is the significance, due possibly to the divine plan, of such a mediocre state of the human faculties. It may be that the existence of things above reason is "partly to make us sensible of the imperfections of our Natures, and partly to make us aspire to that condition, wherein our faculties shall be much enlarged and heightned."¹⁰ The first part of this quotation confirms Wojcik's argument that the question of the limits of reason is a question of the condition of human nature in its relation to its Creator. But the second part of the quotation points to an understanding of the task of man that avoids the strictures of a radical Augustinian anthropology. Boyle seems to point to an active task: the things lying "above reason" are a pointer not just of our infirmity but also of a horizon of fulfillment. That horizon may never be reached in this life (and thus complete knowledge and full certainty remain unattainable, too), but it is man's task, because his condition, to strive toward it. This striving is understood in terms of a search for truth (rather than for certainty per se) accompanied by an "enlargement" of the powers of the faculties. Reason's task in this context, as Boyle's spokesman in the dialogue, Sophronius, describes it, is to "perfect" the intellect through rightful exercise:

"I assign Reason its most noble and genuine Exercise, which is to close with discovered Truths, in whose embraces the perfection of the Intellect . . . consists." The exercise of reason is a "perfective action" of the understanding, which to recognize as limited is no disparagement, but actually a sane refusal to "idolize" it. The form the exercise takes is Boyle's version of the discipline of judgment that the virtuosi shared with the *cultura animi* approach: "And a sincere understanding is to give, or refuse its assent to propositions according as they are or are not true, not according as we could or could not wish they were so."¹¹

Another lesson Boyle draws from the existence of things above reason has to do with the human power of self-estimation, itself an important ingredient in man's task. By means of its power to recognize truths that do not admit of complete understanding and of definitive explanation, the mind will become engaged in an exercise of recognizing proportions: it will see that its own measures "in the searching or judging of Truth, are but such as are proportionable to Gods designs in creating us," and it will learn to distinguish things above from things within the reach of reason, thereby learning to discern the former "to be disproportionate to the powers with which it [the understanding] uses throughly to penetrate Subjects, that are not impervious to it."¹² The mind is so framed as to judge both of things without, and of its own nature, infirmities, and powers: it is "as well a Looking-glass as a Sensory, since it does not only see other things but it self too, and can discern its own blemishes or bad conformation, or whatever other infirmities it labours under."¹³ Thus, the problem of the limits of reason is not only embedded in an account of the state of the faculties but related to a program for the exercise of the faculties in which a fundamental step (itself the object of a renewed exercise) is the careful assessment of their capacities. There is room here not only for the advancement of knowledge (again, an advancement within the confines of a limited degree of certainty) but also for the perfecting of the mind.

Boyle's conception of both the limits and the perfecting exercise of reason is best understood, I propose, within a *cultura animi* framework. I will argue that Boyle's rules for inquiry are an expression of virtuoso Socratic skepticism: they are construed as guidelines for a practice of the regulation of assent invested with the role of a mind-ordering discipline—a discipline premised indeed on a doctrine of the limits of the intellect, but also on the possibility of curing its weaknesses, improving its capacities, and building its virtues.¹⁴ Such a view of inquiry, I want to show, rests on a redefinition of the skeptical problem of the standard of truth in keeping with Boyle's conception of the growth of knowledge,

which in turn informs his notions of “right reason” and “experience”: Boyle frames experience as a paideic practice and right reason as a horizon of the perfected mind. His model figure, the Christian Virtuoso, is a figure of the exemplary inquirer, shaped by these notions. It represents, moreover, a development of Boyle’s early moral preoccupation with the government of the mind, reinterpreted as the province of the Christian philosopher—a province as inter- or supradisciplinary as that of the physician of the soul.

This chapter looks at Boyle’s views on the discipline of the examination of opinions and of self, while the next approaches the same topic in Locke’s thought. These philosophers’ conceptions of the work of reason and of the rightful conduct of the understanding in inquiry, I want to argue, rely on the integrated approach to the mind’s distempers and virtues that formed the common ground of the *cultura animi* genres and that were also explored by Bacon and the Royal Society virtuosi. Against this background, their guidelines for inquiry and for regulating assent acquire the function of a method for governing and training the mind, and are thus the equivalent of Bacon’s art of direction or of the virtuoso discipline of judgment. Chapters 6 and 7 will flesh out Boyle’s and Locke’s notion of inquiry thus framed, by looking at the way it is put to work in their experimental methodology, natural theology, and biblical hermeneutics. The central argument of these chapters is that inquiry for Boyle and Locke is an activity firmly placed within these authors’ conceptions of both the frailties and the educability of the mind, and that as such it is presented not as a methodized set of formal procedures meant to secure impersonally objective knowledge but rather as a package of guidelines to be used as instruments in a curative and cultivating regimen, assumed as the task of a Christian philosopher.

The weak mind and the virtues of a free inquiry

Boyle’s preoccupation with the examination and the remedy of what in *Things Above Reason* he called the “infirmities,” “blemishes,” and “bad conformation” of the mind is a constant streak in his works, from the early devotional writings of the 1640s to the texts of the natural philosophical period in which he assessed the merits of the experimental study of nature from the perspective of a Christian philosopher’s duty, from the 1650s to the 1680s and up to his death in 1691.

The ethical value of self-examination features prominently in Boyle’s essays written in the latter half of the 1640s at Stalbridge. In his “Doc-

trine of Thinking," for instance, he writes that he finds the "Contemplation" of one's thoughts a most noble and worthy employment.¹⁵ This text is concerned with the inspection of the mind's "motions" in its tendency to "raving" and "wandering," and with devising a program for training its attention and perseverance in meditation, in a manner that recalls the similar endeavors of the works on the regimen of the soul, most notably, among the texts I have investigated in the second chapter, those of Thomas Wright.¹⁶ Similar concerns are expressed in his *Occasional Reflections*, which was also composed during his Stalbridge years but published in 1665, that is, during his Oxford period, when he had already become associated with the Wilkins circle and produced his first series of air-pump experiments. Boyle compares his text with the religious meditations of Bishop Joseph Hall and says that where he differs from this worthy author is in explaining the "Usefulness of [this] way of thinking."¹⁷ Part of that usefulness has to do, Boyle explains, with the capacity of meditation to compose and strengthen the mind's powers in its service to God. The "mental Exercises" that meditation consists in are a fit remedy against self-love, passions, and evil thoughts and thus are themselves to be considered "Expressions of Devotion."¹⁸ A large section of Boyle's prefatory discourse about the usefulness of occasional meditation is consequently devoted to the way it "conduces to the exercise and improvement of divers of the faculties of the mind": the faculty of observation, the rational faculty, and the will and affections. Exercise, Boyle notes, is the key conduit to improved faculties. To reinforce the point, he uses the same analogy with the training of the body that Bacon employed in describing the arts for mending the intellect: it is through exercise, Boyle says, that the faculties of the mind, just like the limbs of the body, are made "vigorous and nimble."¹⁹

Boyle's early expressions of personal piety are thus phrased in terms of the discipline for the mind that combined "spiritual physick" and "Socratic medicine" in the *cultura animi* genres. Also in keeping with the general approach of this literature to the importance of practical versus speculative knowledge, Boyle explains that he is interested in the "Practicall Part of the Doctrine of Thoughts," which deals with mind regulation and improvement, rather than in the "Nice and Perplext Speculations" of "[School] hermits."²⁰ In *Occasional Reflections*, he similarly commends the mind-ordering effects of the books of practical devotion: unlike "Speculative and Polemical Divinity," which teaches their readers how to talk "with more Acuteness, and Applause," the books of devotion can "cleanse" men's consciences, "pacifie the troubles of their Minds," and instill pious joy; they are, as a consequence, also apt to promote in their readers the

mental disposition required for social and religious peace, and thus “heal the Wounds” wrought by “Schism or Scandal.”²¹ If religion must be of such a practical nature for it to have the expected religious effect, so does the study of the various philosophical disciplines need to be pursued with a view to cultivating a virtuous mind: in his *Aretology*, Boyle enlists the study of physics, metaphysics, and mathematics in his program for the pursuit of “useful” knowledge in the service of “Ethicks.”²² Boyle’s early views on the uses of religion and of the curriculum, as well as on the rooting of social order in well-ordered minds, are thus on a par with those of the physicians of the soul and of Glanvill’s Bensalemite divines. And like the latter, as well as the less radical Augustinians of the former, Boyle thinks that the way to salvation is through a collaboration of divine assistance and human effort: this is the theme of the first “occasional reflection,” whose moral is that “though we cannot reach Heaven by our good Works, we shall not obtain it without them.”²³

Boyle gradually came to think that the study of nature, seen as a study of God’s works, had a rightful place among the disciplines that, rightly pursued, are useful for the twofold increase of man’s knowledge and piety. In *Occasional Reflections*, the whole of the “Productions of Nature, and Art,” be they God’s or man’s, formed the world on which the meditator applied his mental powers.²⁴ There, the world, and the book of nature as part of it, functioned like a reservoir of moral exempla and emblems, out of which the pious Christian translated useful spiritual meaning.²⁵ But the potential of a natural philosophical rather than emblem-book type of investigation of the world of nature is signaled by Boyle’s epigraph to the book, a quotation from the second book of Seneca’s *Natural Questions*. The passage is from the conclusion of Seneca’s discussion of the phenomenon of lightning, which considers the ethical (mind-composing) “use” of that investigation; in the 1614 edition, it reads: “For in all things, and in all speeches, we ought to intermix somewhat that is wholesome and profitable. When as we sound into the secrets of Nature, when as we entreat of divine things the mind must be freed from all passions, and settled likewise in some sort.”²⁶ The same passage features again in Boyle’s *Usefulness of Experimental Natural Philosophy* (published in 1663, before the *Occasional Reflections*, but composed later, in the early 1650s), where Boyle’s natural philosophical interest supersedes that of the emblem-book meditator, although the concern with what he calls the “usefulness” of the study of nature “for the Minde of Man” remains as strong.²⁷ The use in question is again of the order of the improvement of the faculties of the understanding and the will, which, “perfectionated”

by knowledge and devotion, are capable of “wearing the Glorious Image of Its [the mind’s] Author.”²⁸

The “perfecting” of the mind’s capacities remains a prominent aspect of Boyle’s conception of the utility of experimental investigations in his later work. The framework within which this theme is increasingly explored is the reflection on the limits and powers of reason, which I touched upon at the beginning of this chapter—a type of reflection characteristic of the general epistemic modesty promoted by the Royal Society virtuosi, which Boyle pursued in a number of works penned around and after the time he moved to London in 1668, while being fully engaged in experimental work. The general common concern of such works as *The Excellency of Theology Compar’d with Natural Philosophy* (1674), *Some Considerations about the Reconcilableness of Reason and Religion* (1675)—both composed in the mid-1660s—or *A Discourse of Things Above Reason* and *Advices in Judging of Things said to Transcend Reason* (both 1681) is the role of reason in philosophy and religion. While the theme of the *limits* of reason per se is an epistemological theme that for Boyle, we have seen, is grounded in a theological conception of the human faculties, the *recognition* of those limits, and of the *imperfections* of human reasoning, by the side of the *conduct* of the mind in inquiry so that those imperfections are remedied, are themes that exceed a strictly epistemological approach and represent the counterpart of Boyle’s “doctrine of thinking” in the context of his mature reflection on philosophical inquiry.

The problems Boyle identifies as the core impediments to the rightful, and thus “perfecting,” work of reason are the same cognitive-cum-moral failings of the mind detailed by the line of thought I have investigated so far. There is no extended chart of the passions and errors of the mind in Boyle paralleling those in Bacon, Glanvill, Hooke, or the *cultura animi* texts, but the main themes are present. Here is, for instance, Boyle’s description of the weak mind in *Reason and Religion*:

Our Intellectual Weaknesses, or our Prejudices or Prepossession by Custom, Education, &c. our Interest, Passions, Vices, and I know not how many other things, have so great and swaying an Influence on them, that there are very few Conclusions that we make, or Opinions that we espouse, that are so much the pure Results of our Reason, that no personal Disability, Prejudice, or Fault, has any Interest in them.²⁹

Boyle reinforces his reference to the “weaknesses” and “prepossessions” of the mind by alluding to Descartes and Bacon. He invokes Descartes on the question of the misguiding effects of the notions imprinted on young

heads in early education. From Bacon, he quotes the doctrine of the idols, in particular the *Idola Tribus* (the idols founded on human nature in general), and “divers other innate prejudices of Mankind, which he [Bacon] solicitously as well as judiciously endeavours to remove.”³⁰ Be it because of education, innate tendencies of the intellect, or, indeed, the “fall of our first Parents,” it is a fact that “our Understandings are so universally byass’d, and impos’d upon by our Wills and Affections” that truth is rarely sought for its own sake. Rather, the common motor of knowledge is the “inbred pride of man,” which explains why “almost every man in particular makes the Notions he has entertain’d already, and his Senses, his Inclinations and his Interests, the Standards by which he estimates and judges of all other things, whether natural or reveal’d.”³¹ In the case of *both* natural and revealed things, Boyle warns, men are apt to dismiss those things they cannot understand, explain, or reconcile with their already formed beliefs as “contrary” to reason. This is, for Boyle, an immoderate intellectual-cum-moral behavior, due to the ordinary mechanism of forming beliefs, which he analyzes precisely in the *cultura animi* terms of the conjoined action of flawed judgment, intemperate affections, and the narrowing perspective of pride or self-love.

The combined result of this mechanism is what Boyle calls “prepossession” or “prejudice” (note that in the passage quoted above Boyle uses “prejudices” as an equivalent of Bacon’s “idols”): moved by its self-loving propensity, the mind is “possessed” by its insufficiently examined and passion-driven opinions, which it no longer recognizes as only partial and narrow results, but embraces as definitive dicta. In the *Excellency of Theology*, Boyle explains: “For we have in our nature so much of Imperfection, and withall so much of Inclination to self-love, that we do too confidently proportion our Idea’s of what God can do for us, to what we have already the knowledge or the possession of.”³² In *Things Above Reason*, errors are said to be the result both of a “want of a competent History of Nature” and of “erroneous Prepossessions” or “want of freedom and attention in our speculations.”³³ A prepossessed mind, Boyle thinks with the other virtuosi, is a sure step to a dogmatic mind, which cancels inquiry and closes down upon itself in the fashioning of a definitive doctrine or system. In contrast, a “free” mind recognizes that the search into God’s truths as expressed in all his works (natural and revealed) cannot be complete, since the object far exceeds the capacities of the created mind. It thus realizes that a theoretical system is actually the fruit of “weaknesses” and “prepossessions,” and it can do that because it has become aware, through self-examination, of the distempered tendencies inherent in the human mind, and because it has resolved to keep them

at bay. Such a profession of faith in the value of a “free inquiry” is voiced in the preface to the *Free Inquiry into the Vulgarly Receiv’d Notion of Nature* (composed around the time he was working on *Things Above Reason*, but published in 1686),³⁴ and detailed in its substance in *Advices in Judging of Things said to Transcend Reason*.

Crucial to the success of a free inquiry into the realm of things above reason or “privileg’d things,” we learn from the *Advices*, is a constant denial of self-satisfaction and a steady preparedness to revise formed opinions in light of new discoveries. Such flexibility of mind cannot be mistaken for instability, or wavering. Tentative conclusions need to be formed on the basis of “cogent proofs” and are a form of what in *Things Above Reason* Boyle called the perfecting action of “closing with discovered truth”; but they should always be recognized as only tentative, and the search continued. As a rule of that perfecting action, Boyle formulates the core principle of the regulation of assent; he writes that “a sincere understanding is to give, or refuse its assent to propositions according as they are or are not true, not according as we could or could not wish they were so” and calls this virtue “impartiality.”³⁵ In *Advices*, he elaborates on the subject in a list of six “advices” or, as he also calls them, “paradoxes.” First, we need sufficient proofs: they may be only probable (“it being sufficient that they are strong enough to deserve a wise mans Acquiescence in them”)³⁶ but must be cogent and concurrent, so that assent can be rationally accorded rather than given irrationally, or by chance. The measures of our beliefs should be the things themselves rather than our wishes. A particularly intruding species of wish, Boyle warns, is the wish that “all things were penetrable to our humane Understandings.” That must especially be resisted, as a crowning delusion.³⁷ Second, hasty dismissal of “privileg’d” things as absurd or impossible should be resisted (in conformity also with the resistance to the wish that they be completely penetrable to human reason; cf. the first rule). Here, where things seem particularly hard to comprehend, one may choose either to suspend judgment when no sufficiently ponderous proof appears to the mind, or, more difficultly, one may attempt a virtuoso exercise in flexibility: “such a wary and unprejudic’d assent to opinions that are but faintly probable, that the mind may be ready to receive, without either obstinacy, or surprise, any better argument that shall conclude the contrary of the opinion we favour’d before.”³⁸ Third, we should refrain from denying the existence of things whose manner of operation remains inexplicable. Fourth (as a corollary to the second and third rules), we should refrain from declaring false everything that seems to contradict some received “Dictate of Reason.”³⁹ Such “dictates” may well come under revision in

inquiry. Fifth, we should refrain from rejecting as false those things that we do not know how to reconcile with what we already know to be true.⁴⁰ Sixth, we must not condemn a well-grounded opinion simply because it is inconvenient or may lead to bad consequences.⁴¹

The second, third, and fifth rules refer specifically to “incomprehensible,” “inexplicable,” and “unsociable” truths, respectively. The fundamental rule behind all three is the one formulated in the fourth advice and extended in the sixth: do not reject (in the sense of reject as impossible, reject as absurd, reject the existence of, or reject because inconvenient) things that at first sight seem to question one’s already formulated notions of, or propositions about, things. But such an exercise in cautiousness and freedom of mind must be built on the careful trial of “proofs,” always oriented toward the truth of things rather than toward the satisfaction of one’s “wishes,” which is postulated in the first rule. There are two important things to notice about these rules: In the first place, they do not form a set of formalized procedures but are rather meant to function as prudential guidelines for inquiry. Arnobius, Boyle’s spokesman in *Things Above Reason*, warns that the “advices” are best taken not as “rules” but as “directions” that can “regulate the *Ratiocinations* we make” and as “cautions” apt to help us avoid errors and mistakes.⁴² Thus, in the second place, they are governed by a concern with the care of the inquirer’s mind and take the form of “ways of avoiding to be imposed on by our selves or others.”⁴³ Their role is to guide the mind’s work against the prepossessions, the hastiness of ungoverned assent, the self-satisfying wishes, and the self-love that are responsible for the dogmatic, as opposed to the free, management of knowledge. Their aim, moreover, is the establishment not of objective impersonal knowledge but rather of a species of “objectivity” (or “impartiality”) that stands for the disposition of a mind that has undergone a virtuous reformation.

A true student of God’s works, Boyle believes, is one who has begun to purge his mind of errors and passions; at the same time, this study is itself one privileged way to help with the training of the mind. In *The Christian Virtuoso* (a work published in 1690 but composed around 1681, i.e., at the time of his reflections on things above reason), Boyle makes such a virtuous circle revolve around what he calls a “well-dispos’d mind,” the qualities of which are to be “both docile, and inclin’d to make pious applications of the Truths he discovers.”⁴⁴ This disposition of mind is both requisite for engaging in the study of nature and, in a perfected form, one of the fruits of it. “Docility” in the sense Boyle uses it is the quality of a mind both discerning and flexible, and a mind devoted to truth. It echoes the “humility” of mind that Du Moulin, for instance, translated

as the disposition of “being alwayes ready to receive better information and submit himself unto reason,” which is part of man’s “labour to heale himselfe of all arrogant opinions and obstinate prejudices.”⁴⁵ It is also an echo of Sprat’s description of the “Character of a True Philosopher” as one that is rooted in the “modest, humble, friendly Vertues,” whose main sign is a “willing[ness] to be taught,” and that distinguishes true learners from dogmatic “assertors.”⁴⁶ Similarly, for Boyle, a “docile” man “will easily discern that he needs further Information” when his evidence is not clear, and he has a “Habit of discerning the Cogency of an Argument or way of Probation.”⁴⁷ Docility in this sense is opposed both to credulity and to the usual suspect of the new philosophy, the disputing way of the Schools, which encourages vanity and the elevation of wit above “Sincere Love of Truth.” Experimental inquiry, Boyle claims, is apt to cultivate just this habitual quality of mind in its adepts: “an Accustomance of endeavouring to give Clear Explications of the *Phaenomena* of Nature, and discover the weakness of those Solutions that Superficial Wits are wont to make and acquiesce in, does insensibly work in him a great and ingenuous *Modesty* of Mind.”⁴⁸ Boyle calls this “modesty of mind” an “*Intellectual*, as well as *Moral*, *Virtue*” and describes it in the same terms, familiar by now, of the flexible regulation of assent: to be wary of giving assent too hastily, to form always tentative conclusions, to remain always open to new information, and to be ready to change or discard your own opinions on the basis of new proofs even if your opinions are agreeable to you. Thus, docility is the eminent disposition of a free inquiry. It is also a good example of the move I discussed in the previous chapter, whereby epistemological themes are reshaped in *cultura animi* terms: moderate skepticism is seen as an adequate response to an anthropological position about the limits and weaknesses of reason, as well as the guide of a therapeutic, Socratic practice meant to regulate and “perfect” the operations of the mind.

In the same work, Boyle points to a related virtue of inquiry: a flexible mind is at the same time a probing and attentive mind, capable of “a Serious and Setled application,” and used to “Attentive and Lasting Speculations.”⁴⁹ Boyle eloquently compares the experimental philosopher possessed of such qualities of mind to a “*skilful Diver*” who, unlike the “*ordinary Swimmer*, who can reach but such things as float upon the Water,” is fit to “make his way to the very Bottom of it; and thence fetch up Pearl, Corals, and other precious things, that in those Depths lye conceal’d from other men’s Sight and Reach.”⁵⁰ In *Occasional Reflections*, Boyle already emphasized the benefit of occasional meditations for the sharpening of an “attentive observation” of particulars in their

multifarious attributes and relations, and contrasted the deep student of the world with the “ordinary regardless beholder.”⁵¹ Similar references to “attention” in the context of a defense of experimental inquiry reappear in his texts that adopt a more marked natural philosophical voice. True penetration of the grand architecture (or the grand book) of the world, Boyle says in his *Usefulness of Experimental Natural Philosophy*, is the work of the “Intelligent Spectator” but not of the “ordinary Gazer.”⁵² In the *Christian Virtuoso*, he expands on this theme and correlates the idea of a training of the capacity to observe with that of the need to remedy the mind’s frailties. There is a hierarchy of observers of nature, depending on degrees of attention, which are at the same time degrees of freedom from the passions and prepossessions of the mind:

For some Men, that have but superficial, tho’ conspicuous, Wits, are not fitted to penetrate such Truths, as require a lasting and attentive Speculation; and divers, that want not Abilities, are so taken up by their Secular Affairs, and their Sensual Pleasures, that they neither have Disposition, nor will have Leisure, to discover those Truths, that require both an Attentive and Penetrating Mind. And more than of either of these sorts of Men there are, whom their Prejudices do so forestal, or their Interest byas, or their Appetites blind, or their Passions discompose, too much, to allow them a clear Discernment, and right Judgment, of Divine Things.⁵³

Not only does the experimental study of nature require such virtuous qualities of mind as discerning attention to particulars, docility of learning, and flexibility and impartiality of judgment, but it is also a way, Boyle proposes, toward the cultivation of such qualities. We can see here how the concern with the proper regimen of the mind provides Boyle with one major line of legitimation for the experimental, against the metaphysical or theoretical, mode of inquiry. The way this legitimation is grounded in a fundamental conception of the relation between the human mind and the created world will be the subject of the next sections, and I will expand on it in chapter 6. I will note here in addition that Boyle also thinks that the disposition of mind that the experimental study of nature breeds in the inquirer is such as to make experimental philosophy an excellent way to “the reception of a Reveal’d Religion.”⁵⁴ The core claim is that the docile habit of mind is most agreeable to the study of revealed religion precisely on account of its recognition of and openness to the “dark and abstruse,” which is also a (moral) guard against private “laziness” and “presumption”: “A Sober and Experienc’d Naturalist, that knows what Difficulties remain, yet unsurmounted, in the presumedly clear Conception and Explications even of things Corporeal, will not,

by a lazy or arrogant presumption, that his knowledge about things Supernatural is already sufficient, be induc'd to Reject, or to Neglect, any Information that may encrease it."⁵⁵

Impartiality, flexibility, docility, and attention are virtues of the mind that for Boyle are the fruit of a free inquiry. The "perfecting" role of such inquiry is that of a curing and cultivating program conceived in strong *cultura animi* terms: the discipline of attention, of epistemic modesty, and of flexible judgment in inquiry is seen to work on a datum of "imperfection" (in which errors, passions, and self-love coalesce) toward a habituation ("accustomance") of the mind into a healthy epistemic behavior with moral value.

In keeping with such a program, Boyle has a fine-grained conception of reason that encompasses the whole spectrum of the stages of the education of the mind: its uncultured state, the cultivating process, and the (ideal) horizon of the process. In the section of *Reason and Religion* that describes the weak mind, Boyle distinguishes between men's "Ratiocinations," which are often corrupt (by weaknesses and prejudices), and "the Principles or the Dictates of *right Reason*."⁵⁶ I take "ratiocinations" thus described to stand for products of the uncultured state of the mind, and the exercise of reason in the discipline of inquiry detailed above as the cultivating, "perfecting" instrument. I would like to argue in what follows that "right reason" stands for the horizon of the perfected mind and that it is allied with a paideic conception of "experience."

Reason and experience

"Right reason"

The notion of "right reason" had had a long history by the time Boyle was writing. It is not my purpose to review that history here in any detail; I wish only to suggest the way in which I think Boyle refashioned the notion for his own purposes. In the medieval scholastic conception, right reason was the instrument through which man's intellectual soul was supposed to recognize and obey, through the light of nature, the moral principles of natural law. Conceived either as the higher intellect, the "law written in the heart" (cf. Romans 2:15), or the "candle of the Lord" (cf. Proverbs 20:27) still shining (or perhaps only flickering) in man's soul, it was the repository of basic notions or principles through the activation of which man could insert himself in the rational and divine order of the universe.⁵⁷ With the Protestant Reformation, the light of nature was felt

to be insufficient for man's obedience to God, and the supernatural light of grace and illumination through the word of God was called upon to assist man's otherwise depraved intellect. As Robert Greene has shown, right reason was losing ground with the strict Protestants' attack on human reason, but it did survive thanks to a number of Christian humanist and moderate Protestant transformations of the idea, largely indebted to the Neostoic revival.⁵⁸

Thus loaded, "right reason" came to inform the debates about rational religion in mid-seventeenth-century England. John Spurr has argued that these debates, in which the Anglican Church strived to keep the higher ground against both its strictly rationalist and its "enthusiastic" opponents, threw into the game at least two notions of reason that were, Spurr maintains, unwittingly conflated: on the one hand, a (new) notion of discursive, morally neutral, "mechanical" reason, involved in devising the Anglican arguments about the capacity of reason to prove that the Scriptures were indeed the Word of God; on the other, an (older) notion that connoted an idea about the reordering of the postlapsarian corrupt human faculties, in particular the command over one's passions and errant will achieved by means of obedience to God's promises and commands as expressed in Scripture.⁵⁹

The interest of Spurr's thesis for the discussion here is that it has been invoked to back up two very different accounts of Boyle's use of "right reason." On the one hand, Thomas Holden takes Boyle to stand at the end point of a shift in the meanings of the term from "the older connotations of virtue, piety, and grace" to "a narrower emphasis on correct ratiocination," understood as reason correctly used and appropriately informed.⁶⁰ On the other, Lotte Mulligan, in an article whose thesis is explicitly rejected by Holden, argues that Boyle's notion of "right reason" actually preserves all the old connotations of "reason seasoned by revelation." In Mulligan's reconstruction, "reason seasoned by revelation" seems to mean both (in scholastic or else Stoic fashion) the moral principles of natural law and (in a Christian mystic or alchemical sense) reason illuminated by supernatural revelation, equal to the illumination achieved by prayer, and similarly providing a "mysterious knowledge" that could unravel the secrets of nature.⁶¹

I would like to suggest that Boyle's notion of right reason does preserve moral connotations that are nevertheless neither of the order of principles of natural law nor of the order of illumination in Mulligan's sense. The moral connotations are rather related to a task of ordering the intellect and mastering the passions, but they are also, against Holden,

consistent with the conception of reason as correct ratiocination. As such, Boyle's use is closer to the load of the term "right reason" in the Neostoic *cultura animi* context I described in chapter 2.

The standard of truth and the growth of knowledge

In the *Appendix* to the *Christian Virtuoso*, Boyle writes: "Our philosophy is so little fit to be taken for a sure and adequate standard of truth, I mean of that knowledge, that is attainable by right reason, that we can have no certain and stable standard of philosophy itself." Human knowledge, just like the human child, needs to go through stages of growth before it can reach maturity: "So that philosophy, as well as knowledge, being a growing thing, we can as little take stable measure of it, as a taylor can take such measures of a child of seven years old, as will continue to fit him during his whole life."⁶² "Right reason" appears thus within a definition of truth as the "knowledge that is attainable by right reason," which is placed in the framework of the question of the standard of truth. Boyle's position here is in stark contrast with a Cartesian rooting of philosophy in a number of foundational, infallibly true metaphysical principles from which subordinate truths can be deduced. For Boyle, the key concept is not "foundation" but "growth," and the standard of truth cannot be firmly and definitively established through intuition but is a horizon of the process of the growth of philosophy. Philosophy is to be understood as "a comprehension of all the sciences, arts, disciplines, and other considerable parts of useful knowledge, that the rational mind can attain to, without supernatural revelation, by reason, that is improved by meditation, literature, exercise, experience, and any other help to knowledge."⁶³ It cannot thus be equated with the doctrine of this or that sect of philosophy. At the same time, the growth of philosophy is a growth of reason itself: philosophy is "reason improved by meditation, conferences, observations, and experiments, and the arts and disciplines produced by them."⁶⁴ Conversely, reason, in one of the meanings of the term, is the faculty "informed" by the liberal disciplines (the arts and sciences), which, once it frames them itself, become fit instruments for its instruction and improvement. This is what we should call "philosophical (or merely natural) reason,"⁶⁵ which therefore develops with the growth of knowledge, a process in which the measure of philosophy is modified.

It is true that in his *Advices*, Boyle addressed the question of the standard of truth in a Cartesian manner, required by the context of a skeptical objection to his rules of a free inquiry. In response to the rule that we

might do well to accept, on enough evidence, things that at first sight seem to contradict some received "Dictate of Reason," the objection is readily formulated in terms of the question of the criterion: if new rules of reason are devised against the old ones, "by what Rules shall we judge of those Rules?" Boyle's spokesman in the dialogue, Arnobius, replies with a refutation of the skeptical argument by appeal to the "clear light" affordable to our ultimately trustworthy faculties: "there is no progress *in infinitum* in the *Criteria* of truth, and . . . our faculties are the best instruments that God has given us to discover, and to examine it by."⁶⁶ There is an innate light of the rational faculty that can be relied on over and above both the temporary propositions ("dictates") the intellect frames about things and the very rules of reasoning. The things that are perceived "immediately and by intuition" include sense perceptions (e.g., "that Snow is white, not black"), metaphysical axioms and "prime notions" (e.g., "contradictory propositions cannot both be true" or "from truth nothing but truth can legitimately be deduc'd"), and "primitive ideas or notions" (e.g., those of "extended Substance or Body, Divisibility, or Local Motion, a streight Line, a Circle, a right Angle").⁶⁷ While aimed at placating the skeptical "criterion" attack and its dangerous consequences, Arnobius's quasi-Cartesian answer does not nevertheless involve a conception of the construction of philosophy on the foundation of the "inner light" of intuitive truths. For Boyle, inquiry into nature cannot rest entirely on confidence in sense perceptions, metaphysical axioms, or primitive notions.

Boyle's examples of truths known intuitively match his examples of what in the *Appendix* he calls "absolute" or "primary" truths, which he sets in opposition with "probationary" truths, which are conditional and hold "upon supposition."⁶⁸ Absolute truths form a type of "dictates of reason" that are primary, self-evident, and thus universally valid principles. Other constructions of reason, based on probationary truths, are only subordinate, inferior dictates of reason, which hold in most cases but not in all.⁶⁹ The categories of the inferior dictates of reason and of probationary truths are of crucial importance to Boyle, since, for him, both natural philosophy and theology work with them, rather than with the absolute truths of metaphysical and mathematical axioms. The latter may have a role to play in guiding reasoning (inference, for instance, obeys the maxim that *ex vero nil nisi verum sequitur*),⁷⁰ in offering general tests for new judgments, or perhaps in providing the highest term of assurance by which more moderate degrees of confidence in belief may be measured. But the bulk of judgments in natural philosophical and

theological inquiry are of the order of inferior dictates of reason and of probationary truths. No “metaphysical certainty” is available in these domains, but only “physical” or else “moral” certainty. “Moral certainty” in its strict sense is used in the domain of practical philosophy, but the model of inquiry it provides (a judicial model of relying upon “cogent proofs” and of comparing a sufficient number of testimonies, or “concurrence of probabilities”) proved so powerful and cogent for the situation in natural philosophy that Boyle often uses the term instead of “physical certainty.” In the *Excellency of Theology*, Boyle concludes: “And there are I know not how many things in Physicks, that men presume they believe upon Physical and Cogent Arguments, wherein they really have but a Moral assurance.”⁷¹

These views about the type of truth and the degree of certainty that obtain in both natural philosophy and theology are a good example of the “mitigated skeptical” position described by Richard Popkin.⁷² But the use Boyle makes of this epistemological category is in keeping with a *cultura animi* project: it is correlated with the notions of the growth of knowledge and of the tailoring of the measure of *philosophy* that is consequent upon it, as well as with the conception of the education of the mind in inquiry on which they depend. The standard of truth cannot be provided by the probationary dictates of this or that stage in the process of informing reason, nor can it be reduced to the dictates of this or that philosophical sect. All such “dictates” can only be provisional and only “morally” certain. The growth of knowledge is not an accumulation of new items that can be safely assessed by the measure of an already established criterion, but is geared toward the attainment of that criterion. The principles of the “free inquiry” Boyle described in his *Advices* were meant to ensure precisely such a substantively understood growth. But we have seen that the impediments to a free inquiry were mainly of the order of the corrupt tendencies of a weak mind. Considered through this lens, the problem of the standard of truth becomes the problem of the false standards that a distempered mind gives itself owing to its “prepossession,” fueled by passions, wishes, and self-love. In *Reason and Religion*, Boyle warned that

if we consider the inbred pride of man, which is such, that if we will believe the Sacred story, ev’n *Adam* in Paradise affected to be like God knowing good and evil, we shall not so much marvel, that almost every man in particular makes the Notions he has entertain’d already, and his Senses, his Inclinations and his Interests, the Standards by which he estimates and judges of all other things, whether natural or reveal’d.⁷³

The probationary dictates embraced for ultimate rules are the fruit of prejudices, partiality, and corrupt affections. They block the growth of reason and thus the revision of dictates and of doctrines in light of new discoveries, because when they are themselves taken as standards, the result is not simply error but the “destruction” of reason: in an eloquent image in the *Appendix*, those who are led by “corrupt affections” in their ratiocinations are compared to the flies that “court a light” but in so doing strike it with their wings and thus actually tend to destroy it, just as finally they themselves will be destroyed by it. The false standards are apt to arrest the growth of reason and the attendant growth of knowledge. On the contrary, a mind that does not vote for definitive “dictates,” does not rest in its own affections and pride, and manages to escape its partiality and prepossessions is a mind that comes to be “*sui juris* again.”⁷⁴ For Boyle, an important role in this coming back to self-mastery is played by the very discipline of judgment and inquiry that is associated with his view of knowledge as a “growing thing.”

Given this reformulation of the problem of the standard of truth, we can look again at the definition of truth as the “knowledge that is attainable by right reason.” If the attainment of the standard of truth through the growth of knowledge depends on the mind’s capacity to master its intemperate tendencies, then self-government and the cultivation of moral-cum-intellectual virtues of the mind are of the essence for the attainment of right reason. That capacity translates, for Boyle, as the capacity to learn “unobvious truths,” which in the *Christian Virtuoso* appeared under the name “docility.” This virtue is explicitly placed in the context of the problem of the standard of truth, of which a poor measure is given by what Boyle calls “mere, abstracted reason”:

And on the score of this *Intellectual*, as well as *Moral*, Virtue, not only he will be very inclinable, both to Desire and Admit further Information, about things which he perceives to be Dark and Abstruse; but he will be very unapt to take, for the adaequate Standard of Truth, a thing so Imperfectly inform’d, and Narrowly limited, as his mere or abstracted Reason.⁷⁵

The notion of “abstracted reason” and the contrast with reason that seeks and admits new “information” represent a further elaboration on the idea of the growth of knowledge and of reason, which is apt to throw more light on the notion of “right reason.” A critical element introduced by this elaboration is the relation between reason and experience, which is also the main thrust of Boyle’s defense of the *experimental* versus the *speculative* as the legitimate form of philosophy.

Abstracted reason and the scope of experience

In several places, Boyle distinguishes among several meanings of "reason." One, which featured in the discussion above, is (a) reason as informed by the liberal disciplines (or the whole scope of philosophy), i.e., "philosophical" or "natural" reason. There are two other meanings: (b) the faculty "furnished with its own original notions and axioms, and with vulgar or popular notices," and (c) the faculty informed by "supernatural discoveries and revelations."⁷⁶ The crucial descriptor in these definitions is the way in which reason is "informed" from various sources. A roughly parallel distinction is between "reason *in abstracto*," which covers meaning (b), i.e., the faculty furnished with its original mathematical and metaphysical axioms, and "reason *in concreto*," which embraces meanings (a) and (c), i.e., the faculty that through its exercise on the data derived from natural and supernatural sources (nature and Scripture) forms beliefs that exceed the stock of original axioms.⁷⁷ Note that there is also some measure of overlap between meaning (b) and Boyle's categories of "absolute truths" and of "primary dictates of reason," and between meanings (a) and (c) and the categories of "probationary truths" and of "inferior dictates of reason."

These senses of "reason" are also captured, but with an important twist, in the distinction Boyle makes in the *Christian Virtuoso* between reason "addressed" to experience and "abstracted reason." The twist comes with the evaluative load placed on "abstracted reason." It is not simply "reason *in abstracto*" (a descriptive category) but reason relying *only* on its original axioms, on common, "vulgar" observations, and also on poorly examined doctrines when what is at stake is the discovery of truths about the world (the world of both natural and supernatural things). "Abstracted reason" is thus a negative normative category pointing to a failure in inquiry. It is "that, which is furnish'd only with its own, either Congenite, or very easily and very early Acquir'd, Notions and Idea's, and with Popular Notices."⁷⁸ As such,

[it is] but a narrow Thing, and reaches but to a very small share of the Multitude of Things knowable, whether Human or Divine, that may be obtain'd by the help of further Experience, and Supernatural Revelation. This Reason, furnish'd with no other Notices than it can supply it self with, is so narrow and deceitful a Thing, that He that seeks for Knowledge only within Himself, shall be sure to be quite Ignorant of far the greater part of Things, and will scarce escape being Mistaken about a good part of Those he thinks he knows.⁷⁹

Abstracted reason is prejudicial to inquiry: truth is rather to be sought after through a judicious use of experience. Boyle defines “experience” as “not only those *Phaenomena* that Nature or Art exhibits to our Outward Senses, but those things that we perceive to pass Within our selves; and all those ways of Information, whereby we attain any Knowledge that we do not owe to abstracted *Reason*.”⁸⁰ These “ways of information” are distributed among three main sources: personal (by sense perception and by the observation of the functioning of one’s own faculties and passions), historical (by human testimony), and theological (by divine testimony).⁸¹ The first two sources may be grouped together under the category of “physical” (or natural, as opposed to supernatural) experience, while the third source is of supernatural or theological experience, which comprises testimonies from the Bible or from inspired persons. All these are sources from which reason should cull cogent information if judgment is to be fair and rational, that is, judgment that approximates right reason. Such judgment is the mark of a true philosopher capable of self-mastery: in contrast to those who rely on “abstracted reason” and thus idolize it, the Christian Virtuosi “Address Reason to Physical and Theological Experience, and direct it how to Consult them, and take its Informations from them.”⁸²

Thus, right reason is reason informed from all sources (Scripture included), while natural reason is only partially informed, since it does not look to theological experience. Indeed, Boyle says that right reason is “a catholick principle, of which philosophy is but an application” and equates it with reason “in its full extent,” i.e., “a comprehension of true notions or propositions, both universal and particular.”⁸³ In describing what it is for a judgment to be in conformity with right reason, Boyle puts the emphasis on “information” (or on the extended sense of “experience”) rather than on “illumination” in a mystic religious sense: it is to rely on “the best and fullest Informations it [the rational faculty] can procure.”⁸⁴ Holden is right to object to Mulligan’s thesis that revelation is “just one more source of information for right reason, and in fact right reason must authenticate and interpret any alleged revelation before it can draw upon it.”⁸⁵ On the other hand, though, the contrast with “abstracted reason” (and not just with “reason *in abstracto*”) adds a specific moral dimension to “right reason,” which is not captured by its being equated with correct ratiocination alone. In fact, for Boyle correct ratiocination itself involves a moral dimension represented by the self-mastery involved in his conception of the discipline of (correct) judgment. “Abstracted reason” is not simply a descriptive notion but is charged with the whole moral load of the critique of the weak, self-loving, and “prepossessed” mind, incapable

of the virtue of docility. To rely on reason abstracted from the information of experience in the inquiry into the truths of God is to measure the standard of truth by inadequate “dictates,” which is the result of the combination of weak assent, pride, and corrupt affections in a mind that does not master itself. It is thus to arrest the growth of knowledge.

Knowledge about both human and divine things, Boyle wrote in the passage on abstracted reason quoted above, cannot be found by man “only within Himself.” Similarly, writing on the subject of the best direction of the mind in natural inquiry, Boyle sets experimental inquiry in opposition not only with the scholastic way but also with mathematics “and other Demonstrative parts of Philosophy.” Demonstrations, he says, may have the advantage of strict examination, but they deal with “Truths a Man knows.” In contrast, an inquiry that seeks information in the whole expanse of “experience” leads to true discoveries, i.e., discoveries of truths that one could not just find in one’s own head. The superiority of this mode of inquiry lies in its capacity to teach the mind the capacity of seeing and accepting unexpected truths, i.e., truths that do not conform to the beliefs the mind has already formed (either its original axioms or the “probationary” truths or doctrines it has already discovered). In learning that, the inquirer also learns that the stock of what he knows already is very small and that there is more to find out.⁸⁶ Thus, learning to open up to the world is learning to downplay your private perspective (and pride): it is to learn docility and modesty of mind. Many truths may appear “improbable” to a mind unaccustomed to probe the territory lying “above reason” either because they are hard to comprehend or hard to explain, because they seem to contradict accepted truths, or because they seem to flout accepted positions. To reject them without inquiry is the danger the “advices” seek to avoid.

This view of the critical role experience has in the growth and education of reason is premised on two fundamental notions about the makeup of the world and of the intellect of man, which underlie Boyle’s defense of the legitimacy of experimental philosophy over speculative or rationalist forms of the pursuit of knowledge about the world (let me stress again that the “world” for Boyle is the world of both natural and supernatural things, the entire scope of God’s creation and testimonies, available to man through both “physical” and “theological” experience).

First, there is the *richness of the world*, one that cannot be reduced to the mathematical or metaphysical axioms, and of which the popular notions and even the philosophical theories can give only a pale reflection. The idea comes out in Boyle’s musings on whether the mind is more likely to be a blank slate or furnished with innate notions. Whatever the

case, he says, whether the supposedly innate ideas are indeed innate or acquired early in life, they are too few and impotent for right judgment in either natural philosophy or theology to be grounded on them:

For in the Divine Nature, Power, Wisdom, and other Attributes, there is a Faecundity that has produc'd a World of Contrivances, Laws, and other things, that exceedingly surpass both the Number and Variety, that the dim and limited Intellect of Man could reach to, by framing and compounding *Idea's*, without the assistance of the Patterns, afforded by the Works and Declarations of God.⁸⁷

The conception of a rich and fecund world, both natural and supernatural, is at bottom a theological conception of the creation and preservation of the world through divine concurrence and of the divine wisdom and power manifested in creation. This conception informs Boyle's ontological doctrine of the "cosmical mechanism" of the natural corporeal world, which is most clearly spelled out in his *Notion of Nature*. But in the *Excellency of Theology* Boyle indicates that he conceives of both the corporeal and the spiritual worlds as part of the same "Great and Universal System of God's Contrivances," and the natural philosophical as well as theological doctrines as part of "the more general Theory of things, knowable by the Light of Nature, improv'd by the Information of the Scriptures."⁸⁸ The idea of the richness and fecundity of divine contrivances that man cannot intuit or deduce by "abstracted reason" is fundamental to Boyle's conception of the experimental study of God's works.

Second, the counterpart of the richness and fecundity of the world is a view about *the naturally ignorant but gradually teachable intellect of man*, which is expressed by two interrelated images. The "dim and limited Intellect of Man" mentioned in the passage above is a recurrent image in early modern, particularly Protestant writings, pointing to the diminished if not entirely corrupt powers of the intellect after the Fall. But Boyle gives a specific twist to the image: the intellect is dim *if* it rests within itself (if it rests in "abstracted reason"), but although it cannot surpass its natural limitations, it may become enlightened and improve its capacities by experience of the world outside man's head. His anthropology is thus intrinsically related to a cultivating project, which is typical of the *cultura animi* approach to the human mind. A related image is that of the mind as a stranger in the world. It is briefly spelled out in a passage that speaks of the role of reason in dealing with the gathered experience, a passage that casts reason in the role of "an able Judge, who comes to Hear and Decide Causes *in a strange Country*" (emphasis mine): although furnished with "general notions" and "dictates of justice," the able judge

cannot frame right judgments about the cases in that unfamiliar country until "an Authentick and sufficient Testimony has clear'd Things to him, [on which] he then pronounces, according to the Light of Reason, he is Master of."⁸⁹

The intellect is not just dim *in itself* but a stranger to the rich world. The process of experience is a learning process whereby the human mind may become acquainted with the fecundity of the divine contrivances. It is with such learning that the use of reason comes out most fully: in making sense of all the sorts of testimonies (natural or divine) that it must learn to see, which it can do only if guided by the virtue of docility. The discipline of judgment that Boyle's method of inquiry formulates is a paideic instrument, which builds both knowledge and a virtuous mind. If judgment in conformity with right reason is judgment appropriately informed, the emphasis in Boyle's texts is on the gathering of information (i.e., "experience") as a *paideia* that involves, crucially, the gradual shedding of bad intellectual tendencies that are at the same time presented as moral failures in an integrated account of the weak or "blemished" mind. Closing inquiry with some partial dictate is often the result of "jealousie" or desire of "repute,"⁹⁰ of corrupt affections, prejudices, or prepossessions. Such dogmatic inquiry is the mark of demonstrative philosophies, embraced by those who rest in self-satisfied abstracted reason. A truly free inquiry is pursued by those who address reason to experience and thus cultivate the mind's impartiality, docility, patience, and perseverance. It is thus the legitimate response to a correct evaluation of human nature and its possibilities. It is also, ultimately, for Boyle, what distinguishes the "Seekers" from the "Despisers" of Truth.⁹¹

The search for truth is not only the guiding principle of philosophy but a duty and an office of the rational creature in her relation with the Creator. To seek truth (the truth of God as expressed in his works and "declarations") "becomes a Rational Creature and a Christian."⁹² To be rational in the sense of employing reason in the search for truth is the highest duty of man as endowed with reason as a "gift of heaven."⁹³ It is a duty primarily because it is the function of a God-given faculty, rather than an injunction assisted by promises and commands. To use that faculty well is indeed to perform correct ratiocinations, but to perform them as they serve the search for God's truths, which is to cultivate reason by experience of all the testimonies available to man, natural and supernatural alike. Boyle's notion of "right reason" points indeed, as Holden puts it, to the well-informed and well-exercised faculty, producing correct ratiocinations. But Boyle includes these features in a story about the use of the gift of reason, which is an office (a function and a duty) of man

and a perfective action that makes possible the growth of knowledge *and* of mind. Thus understood, right reason is the horizon of the moral and intellectual excellence of the mind. It is that not because it is the repository of principles of natural law or the receptacle of supernatural illumination, but rather because it governs man's striving to leave behind abstracted reason, passions, or hasty conclusions and engage in virtuous inquiry.

The Christian philosopher

For Boyle, the world was intended by its Creator as a "School of Virtue" or else as a "Ship" that "helps to convey him [the Christian] towards his Journey's End."⁹⁴ The paradigmatic student or traveler is of course the Christian Virtuoso, who stands for a figure alternatively called "a Rational Creature and a Christian" or "a Christian Philosopher."⁹⁵ Steven Shapin has rightly pointed out that this figure did not conform to any predefined disciplinary or professional role in the intellectual space of early modern England.⁹⁶ Boyle's original cultural contribution, Shapin claims, was to fashion a new intellectual identity out of reshaped elements of what were considered the discrete and largely incompatible identities of the gentleman, the pious Christian, and the philosopher/scholar.⁹⁷ Shapin's concern is with the legitimacy of this new identity in terms of credibility and trustworthiness; as a consequence his analysis focuses on what he sees as strategies for the presentation and recognition of self in the social space. I have moved the focus of attention onto the question of the mental discipline involved in the *education* of the Christian philosopher as an object worthy of historical investigation in itself, and not only as an element of the *presentation* of a (new) credible identity. From this perspective, Boyle's exemplary figure belongs with the (older) culture of regimens that had already developed a cross-disciplinary core doctrine about the cure and cultivation of the mind that could be put to use in the grooming of the devout Christian, the philosopher, and the actor in "civil conversation" alike. An early admirer and practitioner of the philosophical and religious "physick" for the soul, Boyle continued and strengthened the move begun in England by Bacon and continued by the Royal Society virtuosi, of claiming for experimental philosophy a rightful place among the disciplines serving a *cultura animi* program. He gave an articulate defense of experimental philosophy in *cultura animi* terms by devising a powerful account of experience as *paideia* (applied to the entirety of God's creation and testimonies), as well as a view of reason as

a learning capacity apt to “perfect” a weak, ignorant, but teachable mind, on condition that it applies itself to the world of experience.

Placed in this perspective, the Christian Virtuoso, seen as the protagonist of a paideic scenario, is emblematic not only as a social but also as a solitary figure. The distinction does not overlap with the terms of the controversy over the merits of the active versus the contemplative life but refers to the aspects under which the student of God’s works could represent to himself the sites of the cultivation of the mind, *within* the territory of an active life. In the previous chapter I showed that the community of natural philosophers was valued by the virtuosi not only as a forum for establishing norms of credibility but also for its therapeutic benefits. Boyle also gestures toward such values of the community of “friends,” whose rational conversation can enhance both civility and mental vigor and health. At the same time, though, the training of the mind is to a large extent a personal, solitary affair, insofar as the stage of the fight with one’s own frailties is ultimately one’s own self. The preface to the *Christian Virtuoso* paints (the mind of) its author as an exemplary theater of such a trial and effort. Boyle’s speaker tells us that the text was chiefly written for his friends, yet,

I did not write it *for them only*; but was willing to lay hold on some of the Occasions that the *Series* of my Discourse offered me, to excite in myself those Dispositions that I endeavoured to produce in others: And, by insisting upon some Reflections, impress them more deeply upon my own Mind.⁹⁸

The double aspect—the social and the individual—of the effort of self-examination and self-cultivation is actually recurrent in the various trends of the *cultura animi* tradition. Socrates and the philosophical physicians of the soul conducted their therapeutic scrutiny both within their own selves and in searching conversation. Augustine and the spiritual physicians had both the “inner man” and the community of “brethren” to serve as arenas of self-inspection and soul purging.⁹⁹ In a similar way, Bacon represented the sites of the arduous search for truth as both the community of friends and the theater of the individual mind, wherein “I have committed myself to the uncertainties and difficulties and solitudes of the ways.”¹⁰⁰ And so, too, Boyle’s Christian philosopher relies on the combined help of self and friends.

The construal of the exercise of reason as the office of a rational creature whereby it fulfills a role assigned by its Creator is also an indication that the social and the solitary aspects of the work on the soul do not overlap with the spheres of the public and the private man any more

than they do with those of the active and the contemplative lives. Conal Condren's study of the language of "office" in the early modern period has drawn attention to the fact that the set of functions, responsibilities, and virtues associated with the idea of rightly performing one's office extended to the realm of what, from the perspective of the private-public dichotomy, would be considered the most intimately private sphere: man's soul or conscience. It was the *absence* of office, and thus the thwarting of its moral economy, that was labeled (derogatorily) as "private."¹⁰¹ For Boyle, the duty to God of a rational creature—and thus of the Christian philosopher, seen as the exemplary model of such a creature—included the "official" responsibility of the right management of the gift of reason in the service of useful knowledge and piety. This duty was located in the innermost sphere of human life (the soul) while at the same time carving the moral space of a relational existence—the soul's relation to God and to other human beings.

John Locke and the Education of the Mind

Limits of reason, useful knowledge, and the duty to search for truth

In an essay entitled “Of Study,” written in 1677, during the period of his travels in France (1675–79), John Locke noted: “We are here in the state of mediocrity—finite creatures, furnished with powers and faculties very well fitted to some purposes, but very disproportionate to the vast and unlimited extent of things.” To try and identify in detail the extent and the limits of the reach of our faculties would therefore be an endeavor “of great service,” but one that can deliver accurate results only “after a long and diligent research.”¹ It was such research that Locke had proposed to himself in 1671, when he drafted the first two variants of what was to become the *Essay concerning Human Understanding* (1690). At that point, the inquiry into the nature of the human understanding had been occasioned by a conversation on the subject of the principles of morality and revealed religion.² Previously, in a couple of medical writings of the late 1660s—a decade during which he had joined Robert Boyle, Richard Lower, and subsequently Thomas Sydenham in their experimental researches, mainly (iatro)chemical and medical—Locke had also touched upon the question of the powers of the human faculties and the consequent need of delimiting the territory of their rightful use.³ In the 1677 essay, he wrote that the topic needed further mature consideration, so that for the moment he would “suspend”

his previous reflections. But he also added a “Memorandum” to himself, sketching two issues: the areas of knowledge outside human ken and those where the pursuit of knowledge is both possible and useful. Among the former he listed “things infinite,” the “essences . . . of substantial beings,” and the manner “nature in this great machine of the world produces the several phenomena, and continues the species of things in a successive generation.” As for the latter issue, he wrote:

That which seems to me to be suited to the end of man, and lie level to his understanding, is the improvement of natural experiments for the conveniences of this life, and the way of ordering himself so as to attain happiness in the other, i.e. moral philosophy, which in my sense comprehends religion too, or a man’s whole duty.⁴

Locke’s transparent reference to the tract *The Whole Duty of Man*—the extremely popular primer of the moral religion promoted by the Restoration Church of England—indicates his favorable view of that practical line of divinity and his similar conception of useful knowledge pursuits, which could ensure both provision for this life and the ordering of man’s soul in view of the afterlife. Such pursuit was opposed both to the “art of disputing” and to “useless speculations,” and looked to the discovery and remedy of men’s interests, prejudices, unruly desires and passions, vanity and ignorance.⁵ It also involved, of course, a careful assessment of the limits and possibilities of our faculties; the conclusions of Locke’s “long and diligent research” therein (of over two decades) would receive fully rounded expression in the several published editions of the *Essay*.

The limits-of-reason theme, aligned with the epistemic modesty and the charts of certain and probable knowledge that Locke shared with the English virtuosi, is a well-known feature of the *Essay*.⁶ Less popular, though, is, in Richard Yeo’s words, Locke’s commitment to the “pursuit of knowledge as a moral duty.”⁷ I would like to argue here not only that the duty to search for truth is indeed central to Locke’s epistemology, but also that this theme is correlated in his thought with the “usefulness” of knowledge pursuits, in particular with the dimension of “usefulness” I have highlighted so far, as bearing on the task of diagnosing and educating the human mind. As in Boyle’s case, we can recognize the dynamic element in Locke’s approach to reason, knowledge, and mind if we look at it from the early modern *cultura animi* perspective. The focus on the limits of reason and on the degrees of certainty and probability seems to have the effect of painting a static picture of the two philosophers’ views on these questions. Highlighting the theme of the education of the mind

that I claim accompanies that of the limits of reason will bring to the fore the dynamic dimension of these views; it will also point to new aspects of the closeness of Boyle's and Locke's conceptions, the fruit of a long collaboration and friendship.⁸

In the *Essay*, Locke notoriously places radical strictures on the domain of certain knowledge: we have "intuitive knowledge" of the existence of thinking in us and of the existence and identity of ideas in our minds; "demonstrative knowledge" of the existence of God, of mathematics, and possibly of morality; and "sensitive knowledge" of the existence of finite things. Everything else falls in the domain of "judgment" or probable opinion.⁹ The essences, hidden causes, and inner workings of created things are bound to remain outside the scope of human knowledge in the strict sense. Like Glanvill and Boyle, Locke goes through a list of "inexplicable" things in his account of ideas in book II of the *Essay*, under the rubric of the "complex ideas of substances." We have no way of grasping the "necessary connections" among the qualities and powers of bodies, such as "the coherence and continuity of the parts of Matter; the production of Sensation in us of Colours and Sounds, etc. by impulse and motion; nay, the original Rules and Communication of Motion" themselves—which are as inexplicable as "the Resurrection of the dead, the future state of this Globe of Earth, and such other Things."¹⁰

But Locke shares with Glanvill and Boyle not only the list of "inexplicable" things, which has the role of curbing presumption and dogmatism and of cultivating epistemic modesty, but also the notion that self-knowledge, understood as a fair and continued assessment of the capacities of the human faculties, is central to the task of useful knowledge pursuits. This task is at the core of man's relation with his Creator. As narrow as the human understanding may be, it is nevertheless furnished with capacities fit for fulfilling its tasks, i.e., knowledge of the Creator and a good conduct of our lives, of which a crucial part is the good conduct of our understanding: "Our Business here is not to know all things, but those which concern our Conduct. If we can find out those Measures, whereby a rational Creature put in that State, which Man is in, in this World, may, and ought to govern his Opinions and Actions depending thereon, we need not be troubled, that some other things escape our Knowledge."¹¹ Moreover, the very existence of the epistemological domains of the certain and the probable is interpreted by Locke, as it was by Boyle, in terms of the creaturely task relative to the pursuit of truth and the "perfection" of man's mind. In his chapter "Of Judgment" in the *Essay*, Locke says that the little certain knowledge we have may have been given us "as a Taste of what intellectual Creatures [i.e., angels] are capable

of” in order to “excite in us a Desire and Endeavour after a better State.” Certainty, then, is not only an epistemological category but an image of the perfection that is above us and an incentive to seek that perfection. Equally, probability is not only an epistemological division but also a field of struggle for a creature in a state of “mediocrity”: the struggle with the “twilight” of probability is meant to test us (we are in a state of “probationership”), to curb our presumption (by making us “sensible of our short-sightedness and liableness to Error”), but also to prompt us to seek “with Industry and Care” the way to “a State of greater Perfection.”¹² Thus, for Locke, the question of the boundaries of human knowledge and the notion of a proper conduct and perfecting of the intellect are closely linked: the counterpart of human ignorance is the recognition of those provinces where the employment of the intellect is not only possible but useful and the recognition of a duty to use one’s mind well.

Locke’s reflections on the relation between our epistemic duties and self-knowledge form the context not only for the theme of the *limits* of reason and of the degrees of certainty and probability, but also for that of the *corruptions* of the mind. The rightful conduct of the understanding for him involves both the careful assessment of the reach of the faculties and of their domains of application, and a regimen for curing the infirmities and cultivating the strengths of the mind. In “Of Study,” Locke wrote:

It will be no hindrance at all to our studies if we sometimes study ourselves, i.e. our own abilities and defects. There are peculiar endowments and natural fitnesses, as well as defects and weaknesses, almost in every man’s mind. When we have considered and made ourselves acquainted with them, we shall not only be the better enabled to find out remedies for the infirmities, but we shall know the better how to turn ourselves to those things which we are best fitted to deal with, and so to apply ourselves in the course of our studies as we may be able to make the greatest advantage.¹³

Our pursuit of knowledge needs to be built on and directed by what we learn by looking into ourselves. The kind of self-study Locke recommends has all the colors of the care of the mind developed by the *medicina-cultura animi* literature. It is to become acquainted with the “infirmities” of the mind and try to figure out the best “remedies.” It is also to understand its powers and try to orient them toward what they are fit to accomplish. That orientation, which involves the choice of some course of study, is equally a course of training for the capacities of the mind: the pursuit of knowledge is thus premised on a program meant to tend and nurture the human mind. The knowledge sought after, Locke adds, is of a kind that

should be appraised by features like “fitness” and “usefulness”: it needs to be knowledge for which the capacities of the human mind are fit, so that it becomes knowledge that is capable of training and enhancing those capacities, and thus that it proves “advantageous” to man’s mind and by extension to his life.

The “infirmities” and “defects” of the mind represent a topic on which Locke pursued as continued reflection as he did on that of the limits and proper use of the human faculties. The sketchy observations on the topic in his letters, Journal fragments, or the first draft of the *Essay* prepared the discussion of the nature and causes of error that forms the subject matter of several chapters in the *Essay*: most notably IV.xx (on error), but also I.iv.22–24 (the conclusion of his attack on innatism, showing that lazy credulity is the effect of that doctrine); II.xxix–xxxii (on obscure, confused, fantastical, inadequate, and false ideas); III.x–xi (on the abuse of words); IV.vii (on the ill use of maxims); and the two chapters added to the fourth edition of the *Essay* (1700), II.xxxiii (on the association of ideas) and IV.xix (on enthusiasm).¹⁴ Another planned addition to the fourth edition, completed by 1697 but published only posthumously and separately in 1706, *Of the Conduct of the Understanding*, is Locke’s most extensive reflection on the subject. In this text, the mind is said to be plagued by all sorts of “Weaknesses and Defects,” comparable to the “Diseases of the Body,” the full picture of which would be gathered “if the Mind were thoroughly study’d.”¹⁵ Indeed, the *Conduct* is largely an inventory of these defects, with an explicit Baconian opening,¹⁶ as part of a natural history of the mind yet to be completed.

Locke’s approach to the limits and corruptions of the mind is shaped by a Christian-philosophical conception of man’s task of governing and educating the powers of his mind as a God-assigned duty. This conception is naturally aligned with the developments in the early modern *cultura animi* tradition. The anthropology characteristic of this tradition is one that Locke shared: human nature is corrupted in a variety of ways, but its depravity is not insurmountable except through divine grace; human concurrence is required for salvation, and man’s care of his own soul is assumed as a Christian task and expressed in a program of religious-philosophical regimens. Reason is man’s principal instrument in this task. For Locke, reason is a “dim candle” incapable of the full light of knowledge (reserved, in his scheme of things, for angels and just men made perfect).¹⁷ The work of reason is also regularly thwarted by the infirmities of the mind. At the same time, though, the faculties and powers we are born with are “capable of almost any thing,” provided we exercise them

to the full.¹⁸ The mind is still a “candle of the Lord,” even if a “dim” one: its light is enough to do its proper work, but the labor will have to be patient, wearisome, and severe.¹⁹

Locke’s view of reason encompasses the territory of the possible states of the human mind as circumscribed by a conception of its limits and corruptions, its progress and education, and its full-blown, healthy activity, exercised in conformity with its rightly acknowledged capacities and proper use. This view is in tune with the similar conception in the *cultura animi* line of thought, which measures the distance between, e.g., Bacon’s distorted mirror and clear mirror of the mind, Reynolds’s corruptions and dignities of the human intellect, or Boyle’s flawed reasoning and right reason. This conception is uneasily interpreted either as an advocacy of Enlightened triumphalist reason or as a hard-line Augustinian condemnation of depraved human nature.²⁰ Such contrasting interpretations are due to an unbalanced stress on either the “optimistic” or the “pessimistic” assessments of the human powers, which are actually made to cohere in Locke’s, as in the *cultura animi*, conception that takes the human mind as an object of cure, training, and cultivation.

A natural history of the distempered mind

Description and regulation

The undertaking of the *Essay*, as Locke explains in his introductory chapter (I.i), is to use the “Historical, plain Method” in considering the “discerning Faculties of a Man, as they are employ’d about the Objects, which they have to do with.”²¹ An exposition of the operations of the understanding guided by this descriptive experimental method is indeed pursued through the *Essay*, especially in the second book’s account of sensation and reflection, of perception and volition, of retention and the “discerning” operations of comparing, compounding, naming, and abstraction; and in the fourth book’s account of the mechanism of “sagacity” (whereby reason “finds out” ideas) and “illation” or inference (which is reason’s act of ordering intermediate ideas and discovering the connections between ideas along the inferential chain).²² But the description of the operations does not exhaust the scope of Locke’s natural-historical investigation of the intellect. That investigation also includes the discovery of both the limits and the weaknesses of the mind (a misrepresentation of the limits is in fact, for Locke, one instance of the weaknesses). The mismanagement of the operations of the understanding is as

important to Locke as their nature, and, as I will show below, his charts of the former are consonant with the types of anatomy of the distempered mind characteristic of texts in the early modern *cultura animi* tradition. It is significant in this sense that Locke's *Essay* was heralded by his contemporaries as a new logic,²³ but his treatment of the mind's frailties and their remedies is in fact germane to a wider context, of which logic is only a member, and which I have described as the common ground of the *cultura animi* genres.

The natural history of the *distempered* mind introduces a normative dimension into the descriptive tenor of the general natural history of the operations of the understanding. This dimension is signaled by Locke from the start, in the introductory chapter of the *Essay*. Immediately after the definition of his "Historical, plain Method," he goes on to say that his inquiry will serve to show how "we *ought* to regulate our Assent, and moderate our Perswasions" (emphasis mine).²⁴ This statement is placed in the context of a preliminary picture of mankind's ill use of their understandings, resulting in dogmatism, sectarian disputes, or skepticism, which will be detailed in his discussions of error. Locke reinforces the normative dimension by signaling a specific understanding of human nature: the *Essay* will inquire into "those Measures, whereby a *rational Creature* put in that State, which Man is in, in this World, may, and ought to govern his Opinions, and Actions depending thereon" (emphasis mine).²⁵ The normative load attached to the notion of "rational creature" is implicit in the *Essay*, as for instance when he notes, in his discussion of how assent "ought to be *regulated*," that he is referring to "the Mind which searches after Truth, and endeavours to judge right," which is a disposition that is not given but acquired.²⁶ It becomes explicit in the *Conduct*, in a passage echoing the Ciceronian idea of the "seeds" of reason that need to be cultivated by philosophical exercise: "for though we all call our selves so [i.e., 'reasonable creatures'], because we are born to it if we please, yet we may truly say Nature gives us but the Seeds of it; we are born to be, if we please, rational Creatures, but 'tis Use and Exercise only that makes us so, and we are indeed so no farther than industry and application has carried us."²⁷ The description of the operations of the understanding has as a counterpart the notion that man has the capacity to *become* a fully rational creature through the education of its powers; the "historical, plain Method" of the *Essay* stands side by side with the regulative prescriptions for the rightful conduct of the mind in both the *Essay* and the *Conduct*.²⁸

In the first three chapters I noted that the *cultura animi* charts of the distempers of the mind (e.g., those in Bacon, Wright, Reynolds, Glanvill,

and Hooke) seem to be offered less as a theoretical doctrine than as general instruments for a (lifelong) practice of self-scrutiny and self-regulation. In a perfectly similar move, Locke offers what he says are only the first steps toward a history of the distempers of the mind in his *Conduct* in order to “excite Men, especially those who make Knowledge their business, to look into themselves.”²⁹ The counterpart of this history, for Locke, as for the other authors investigated here, is a practical doctrine about a regimen of the mind, mainly centered on a discipline of judgment, devised as an exercise of examination and of the regulation of assent. In the remainder of this section I will look at Locke’s cartography of the distempered mind and will note the complex interrelations of its cognitive, conative, and moral dimensions, of the kind encountered in the Augustinian-Socratic charts of the mind. The next section will be devoted to his conception of the remedial powers of examination and the regulation of assent, which, I will argue, is the important practical side of his theory of knowledge and judgment.

Defects and weaknesses

Reason’s exercise, Locke tells us in his *Essay* chapter “Of Reason,” consists in the discovery of ideas (“sagacity”) and in ordering them so that their “agreement” or “disagreement” is grasped and right conclusions are drawn (“illation” or inference). This is, he maintains, a natural mechanism of the mind (a “native faculty”) that is more fruitfully observed in the “enlargement of our Knowledge, and regulating our Assent” than the artificial rules of scholastic syllogism.³⁰ In intuitive knowledge, the agreement or disagreement of ideas is perceived immediately; in demonstration, it is perceived via intermediary ideas that are indubitably seen to cohere or not; in judgment, it is “taken” to be so, again via intermediate ideas that are judged probable or improbable on the basis of testimony.³¹ Reason fails us in several ways, corresponding to the stages in this process. It may lack ideas or it may work with obscure and confused ideas; it may not see their connections or it may fail to order them correctly; and it can do so because it proceeds upon “false principles” or because it relies on “dubious words.”³² Locke’s account of error builds on this analysis of the reasoning faculty and its mechanism. But that account extends the explication of this core mechanism of flawed reasoning into a variegated cartography of both the external conditions of knowledge and the inner workings of the mind that has no match in Descartes, for instance, but that is congruent with those in Bacon, Reynolds, or Glanvill.

The lack of ideas (or “proofs” for reasoning) may be attributable to external conditions outside the person’s control—a topic that points to Locke’s sensitivity to the social dimensions of the question of the pursuit of knowledge. Those lacking the material means to enable the gathering of information cannot be expected to advance too much in “learned and laborious Enquiries.” Nevertheless, Locke thinks that neither lack of means nor lack of time can prevent anyone from engaging in the basic duty of thinking about his own soul and becoming sufficiently informed in matters of religion.³³ The truly disabling situation is that of men coerced by the “*Laws of their Countries*” to become “enslaved” in their understandings and to “swallow down” the official (especially religious) doctrines of their land.³⁴ Locke’s writings on the question of religious toleration from the late 1680s on develop his belief in the necessity of political freedom for what he increasingly considered to be every person’s duty to educate the freedom of her own mind.³⁵

But apart from these external disabling situations, and from the case of those born with a naturally poor reason, the lack of ideas required for right reasoning is imputable to men’s own failures. This category of error is similar to that of Reynolds’s “voluntary error”: blindness to the relevant proofs is in this case due to the “want of will” to see them, which, Locke says, is a result of laziness, aversion for study, or fear of having prejudices refuted. Such people resist the labor of finding and examining proofs owing to this general flawed disposition, and they “take upon trust” the convenient or fashionable opinion.³⁶ The same holds for what Locke classifies as the last case of the “wrong measures of probability” in the *Essay*, which includes errors due to a voluntary self-enslavement to the authority of “common received Opinions”: one believes what the authoritative figures around one believe (friends, parties, sects, leaders), often because of one’s interest or passions.³⁷ The authority-induced belief is also largely one of “no Opinion at all,” as in the case of those who cannot even be said to reason at all, who hold opinions without really understanding what they hold or why.³⁸ The force of authority is also involved in Locke’s first item in the list of “wrong measures of probability”: doubtful or false propositions taken up for principles. His examples include the principles cemented by the doctrine of innate ideas, which he refutes in book I of the *Essay*; the Catholic doctrine of transubstantiation; and the Enthusiastic doctrine of the direct communication of the divine spirit, which he attacks in chapter xix of book IV. For Locke, these are examples of unexamined principles “imbibed” early in one’s education, “swallowed” unthinkingly out of reverence for some authority,

and subsequently maintained with “obstinacy” and often imposed on others.³⁹ Locke’s (Socratic) attack on the human tendency to suit beliefs to the requirements of interest and parties, and thus to form beliefs with blind assent or implicit faith and to maintain them with obstinacy, is relentless in both the *Essay* and the *Conduct*.⁴⁰ Besides imbibed principles and reverence for authority, the “wrong measures of probability” include two other cases of blocking the examination of evidence: the molding of one’s understanding “to the size of a *received Hypothesis*,” whereby someone who has long held an opinion and possibly built a reputation on it cannot find it in himself to undo it all on the receipt of new information that disproves it (the case of the “learned Professor”); and the coloring of one’s beliefs by one’s appetites and passions, which makes one incapable of “yielding” to new evidence that might overturn his passionately embraced beliefs (the cases of the “covetous Man” or of the “Man passionately in love,” where Locke quotes the Latin tag similarly used by Reynolds and Glanvill: “*quod volumus facile credimus; what suits our Wishes, is forwardly believed*”).⁴¹

If the passions are explicitly classified here only in this latter category, Locke indicates nevertheless that he sees their work involved in several of his categories of error. We have seen that the voluntary ignoring of proofs is associated with “fear” of being destabilized in one’s prejudices; pliancy to authority often matches one’s own passions; and, as he puts it in the *Conduct*, the passions make people believe what suits their (personal) “humour” as well as their “party,”⁴² so that they are inextricably involved both in the “abuse of principles” and in the “received hypotheses” categories of the wrong measures of assent. Similarly, a more general reference to one’s “Temper and Inclination,” coupled with “Laziness, Ignorance, and Vanity,” is involved in the explanation of the “strong conceit” of enthusiasm in the chapter devoted to this “corruption of our Judgments.”⁴³ Moreover, even the work of reason in demonstration can be blocked by “Vices, Passions, and domineering Interest.”⁴⁴ The very reliance on confused “complex ideas”—which result when the simple ideas going into their composition are too few, jumbled together, or undetermined—is often due to “Men’s ease or vanity”;⁴⁵ and it is precisely the lack of clear, distinct, and complete ideas, with “constant names” added to them, that allows free rein to men’s tendency “blindly, and with an implicit Faith, to receive and swallow Principles.”⁴⁶

“Implicit faith” also features in Locke’s explanation of the mechanism of the association of ideas—one of the most insidious defects of the mind, “a Taint which so universally infects Mankind” that special attention needs to be reserved for its prevention and cure.⁴⁷ Association of ideas is

especially pernicious as it affects the core mechanism of reasoning, which to Locke is the correct identification of the agreement or disagreement of ideas. Locke's premise is that there is a natural correspondence among ideas "founded in their peculiar Beings."⁴⁸ The neglect of that natural correspondence and its replacement in reasoning by nonnatural connections is the very mechanism of the association of ideas. This mechanism is enabled by chance, passions, faulty education, or uncritical reverence to authority, and it may become devastating, i.e., blinding to the point of becoming second nature, through habit.⁴⁹ Implicit faith is involved in the cementing of some of the cases of the association of ideas: the notion of Catholic infallibility joined to that of transubstantiation, or the notion of God as a material being. These are examples of assent given without inquiry, which for Locke is the worst behavior of the mind, which "hinders Men from seeing and examining."⁵⁰

Many of the examples cited above involve for Locke the mental phenomenon of vicious habituation, which in the literature on the culture of the mind was captured by the metaphor of the "tincture" of beliefs. He himself uses the image in various places: beliefs are said to give a tincture to the mind, as if changing the color of a substance. In "Of Study," Locke says that whatever opinions are "planted" in the tender mind of the child grow "by continuation of time, as it were, into the very constitution of the mind, which afterwards very difficultly receives a different tincture."⁵¹ A tincturing of the mind also occurs in the obstinate embracing of beliefs, principles, or doctrines, in conformity with the various "parties of men," whereby the mind becomes "preoccupied" and "prepossessed."⁵² In the analysis of the defects of study in the *Conduct*, he similarly writes that "the Mind will take such a tincture from a familiarity with [the preferred study], that every thing else, how remote soever, will be brought under the same view."⁵³ Echoing the idea of the "infecting" effect of the preferred study in Bacon, Glanvill, or Hooke, Locke says that by "conversing" with only one discipline, one will see everything through the partial lens of that narrow self-imposed stance: to the mathematician everything, including divinity or politics, will boil down to mathematical figures; the "speculative" minds will reduce natural philosophy to metaphysical or logical abstractions; and the "chymist" will treat even morality and religion "in terms of the Laboratory."⁵⁴

In his discussions of error, Locke refers generally to what may be called morally flawed dispositions of the mind in inquiry: the laziness or vanity of not looking for the relevant proofs, for instance, or, in the *Conduct*, the laziness and vanity of those who skip from one knowledge to another and are content to gather only a "smattering in everything";⁵⁵ equally,

the “despondency” and laziness of those with too little trust in their faculties, or the “presumption” of those who believe everything can be known.⁵⁶ While these may be characterized as moral-cum-intellectual vices relative to the general conditions of inquiry, Locke also charts a number of defects that have to do with the intimate workings of the mind, in particular with the movement of assent. “Laziness” is also used as a descriptor here, but no longer as a moral vice relevant to intellectual behavior, but rather in a more technical sense, as a particular sort of un-governed working of the mind. Thus, for instance, prejudice is explained as a mechanism where “’tis not the evidence of Truth, but some lazy Anticipation, some beloved Presumption that he desires to rest undisturbed in.”⁵⁷ The laziness of the mind’s anticipation (a Baconian term) is distinct from *my* laziness when I lack the energy to look for the evidence. It characterizes the *mind’s* flawed movement, which here, as in the *cultura animi* literature, is made part of an integrated cognitive-affective mechanism (the “beloved presumption,” the “desire”). What happens to a prejudiced mind is at once a flouting of evidence and a misplacement of affection: “He whose Assent goes beyond his Evidence, owes this Excess of his Adherence only to *Prejudice* . . . declaring thereby, that ’tis not Evidence he seeks, but the quiet Enjoyment of the Opinion he is fond of.”⁵⁸

The same combination of self-satisfaction and mind “tincturing” is involved in Locke’s picture of the maladies of assent attributable to reliance on chance. One such malady is “stiffness”: “men give themselves to the first Anticipations of their Minds,” either because they naturally fall in love with their “first born” (idea), or because of “want of Vigour and Industry” to inquire, or else because they rest content with appearances rather than with truth. But whatever the cause, this is a vicious epistemic behavior: it is “a downright prostituting of the Mind to resign it thus, and put it under the power of the first Comer.”⁵⁹ The other malady is “resignation,” whereby one gives in to the latest opinion, which is as degrading and as subject to chance as the first case: “Truth never sinks into these Mens Minds, nor gives any Tincture to them, but Camelion like, they take the Colour of what is laid before them, and as soon lose and resign it to the next that happens to come in their way.”⁶⁰

Another term Locke uses to describe the inner workings of distempered assent is “precipitation,” with its cognates “haste,” “forwardness,” “rashness,” and “impatience,” which we have seen were at the core of the similar anatomies in the literature surveyed so far. In the *Essay*, Locke introduces it in the explanation of the failure of rightly conducted inference: “the Mind, either very desirous to enlarge its Knowledge, or very apt to favour the Sentiments it has once imbibed, is very forward to make

Inferences, and therefore often makes too much hast, before it perceives the connexion of the *Ideas* that must hold the Extremes together."⁶¹ The observation comes in the context of Locke's critique of syllogistic reasoning, and we recall that Bacon pursued a similar critique precisely in terms of the mind's flawed movements. For both Bacon and Locke, let us add, these are movements of cognition and of desire at once. The same idea is rehearsed in the *Conduct*, where Locke speaks of the "eagerness and strong bent of the Mind after Knowledge" and of the fact that the understanding is "naturally forward"—a propensity that, unless regulated, issues in its "running too fast into general Observations and Conclusions" and hinders rather than aids the understanding.⁶²

One defect of judgment in inquiry Locke repeatedly comes back to is not tracing "the Arguments to their true Foundation"—a jumping to conclusions that is a sure path to "opiniatry"—owing to the "Haste and Impatience of the Mind."⁶³ This phenomenon, which lies behind the uncritical embracing of principles, is explained in the same terms of a desirative impatience of the mind as we have encountered in Galen, Bacon, or Glanvill: "True or False, Solid or Sandy, the Mind must have some Foundation to rest it self upon, and . . . it no sooner entertains any Proposition, but it presently hastens to some Hypothesis to bottom it on, 'till then it is unquiet and unsettled."⁶⁴ Locke adds that this is a potentially healthy "temper" of the mind, which indicates the rightful course of its operation (the establishment of "foundations" for reasoning, which is needed to counter perpetual "wavering and uncertainty," especially in matters of great moment for one's life, such as those pertaining to religion). What is needed is a regulation of this natural propensity, so that by "Use and Exercise" the mind forms a habit of right inference and becomes "accustomed to strict Reasoning, and to trace the dependence of any Truth in a long train of Consequences to its remote Principles, and to observe its Connection."⁶⁵

The mind can thus itself be characterized as "lazy," "idle," or "resty," which accounts for the difficulty of governing both its thoughts and its passions.⁶⁶ The mind's laziness, haste, and impatience are explicitly associated with the failures of inquiry charted in the *Conduct*: the mismanagement of facts (some people amass undigested particulars, others draw axioms from every particular, incapable of detecting the "useful hints" and of using "wary induction"; these are "slow and sluggish" or otherwise "busy" men);⁶⁷ and the mismanagement of proofs (reliance on testimony where scientific instruction is required and use of "probable topicks" where demonstration is required, or, conversely, reliance on one argument, as if in demonstration, where trial of probabilities is

required; this is the result of “Laziness, Impatience, Custom, and want of Use and Attention.”)⁶⁸ Equally harmful is the mismanagement of arguments in dispute: when arguments are sought in order to prove one side of the matter, or when someone is used to “talk copiously on either side” of a question, arguments “float” in the memory, and the mind is only “amused,” incapable of “possessing” itself of the truth. It has the tendency, and may easily fall into the habit, of “reasoning in a lump,” which is to remain content with what appears probable upon a “summary and confused view” or upon partial consideration. This is, again, the effect of the mind’s laziness or precipitation and an instance of its self-serving vanity or presumption.⁶⁹

In sum, the failures of the mind in reasoning are described in terms of its movements and desires, as well as of a “vanity” that is associated here, as was “self-love” in the *cultura animi* texts, with the very irregularity of assent. In response to this analysis of error, the rightful conduct of the understanding for Locke will take the form not of a prescription of formal rules of reasoning but of a remedial regimen of exercises for the mental powers, aimed at training the mind to curb its vanity, master its forwardness and its sluggishness, regulate its assent, and govern its desires.

The regulation of assent: A perfecting exercise

Dispositions and habits: incorporating the rule

On Locke’s view, the regulation of assent, understood as an exercise of the examination of ideas, opinions, and self, joined with the cultivation of a “love of truth,” is the fundamental guide to the conduct of our minds. I will suggest that it is to be understood, not in terms of an epistemological procedure for justifying belief, but rather as a regimen prescribed for repairing the defects and weaknesses of the mind, educating the mind’s powers, and orienting its activity. As such, it is also seen as the bedrock of our inner freedom, the route to a virtuous mind and to personal worth, as well as that by which we fulfill a fundamental duty toward our Creator.

The governing of assent features in Locke’s account of both knowledge and judgment. In the case of demonstrations, even if assent is compelled by the perceived agreement or disagreement of ideas, a certain amount of work of the mind is required, since the evidence is not “*so clear and bright*” as in the case of intuitions, “nor the assent so ready.” In order to perform the work of demonstrative reasoning correctly, the mind needs

"pains and attention" and a "steddy application and pursuit" in following the "Progression [of agreeing ideas] by steps and degrees."⁷⁰ Such "Attention, as is requisite in a long Train of Gradations" is not readily available, though, and a mind incapable of it, or else "impatient of delay," may miss or consider lightly the relevant intermediate ideas in the demonstrative chain. Demonstration requires wary examination.⁷¹ The best exercise for developing the capacity and the habitual ease of examining ideas and their connections in demonstrations is, Locke proposes in the *Conduct*, provided by mathematics.⁷²

In the case of judgment, the regulation of assent is of an equally momentous import. In the *Essay* Locke gives a theory of the nature and degrees of assent in probable judgment and formulates a rule for its government:

*[T]he Mind if it will proceed rationally, ought to examine all the grounds of Probability, and see how they make more or less, for or against any probable Proposition, before it assents to or dissents from it, and upon a due balancing the whole, reject, or receive it, with a more or less firm assent, proportionably to the preponderancy of the greater grounds of Probability on one side or the other.*⁷³

To regulate assent means, then, to examine all the available grounds on which judgment will be passed and proportion the degree of assent to the degree of probability found in the evidence. There are two sorts of grounds: matters of fact about some particular existence, which are capable of human testimony (known either through direct experience or through the report of other observers), and things beyond our senses, not capable of human testimony (which include finite immaterial beings, material beings outside the scope of immediate sensory testimony, and the unobservable workings of nature).⁷⁴ The degrees of assent, conforming to the degrees of probability, go from full "assurance" and "confidence" (these two bordering on certainty) all the way down to "conjecture," "doubt," and "distrust."⁷⁵ The work of examination is as crucial to the fair management of assent in probabilities as in demonstrations, and it similarly involves the attention and care of the mind. The inquirer needs to search into all the particulars that he thinks can throw light on the matter at hand, sift the information "with care and fairness," and conduct "as full and exact an enquiry" as he can.⁷⁶ Especially where testimonies contradict common experience or one another, the inquirer will need to use all his "Diligence, Attention, and Exactness . . . to form a right Judgment, and to proportion the Assent to the different Evidence and Probability of the thing."⁷⁷

Careful *attention* is thus signaled by Locke as the requisite state of the mind for right reasoning in both demonstration and judgment. The term is loaded for him, and he elaborates on it in his discussion of the “modes of thinking” in the *Essay*. There are several degrees of thinking, equivalent to degrees of attention, which everyone can observe in themselves: they range from the earnest contemplation, attentive consideration, or study of ideas and their “Relations and Circumstances,” through the bare observation of trains of ideas, without the mind’s pursuing them or following any direction in its cogitation, to the lack of any regard to the objects of thought, as in reverie, when ideas “float in our mind.”⁷⁸ The “floating” of ideas in inattentive, lazy, and “amused” rather than studious minds is repeatedly mentioned by Locke in his discussions of the defects of the understanding. In contrast, attention of mind, as the power to direct the train of ideas and examine its constituents, is, as he says in the *Conduct*, a “remedy” countering the vicious “wandring of thoughts” and a quality that through exercise may become habitual.⁷⁹ Such “mastery of thought,” which involves the capacity to direct and preserve attention in cogitation, is, Locke says, both crucial to the conduct of the understanding and one of the hardest things to achieve.⁸⁰

If attention is thus a disposition of the mind that needs to be cultivated for right reasoning, Locke also mentions several qualities, which seem to describe dispositions with combined moral and intellectual value, and which are equally requisite in the rightful conduct of our minds. Especially in the context of his critique of the “tincturing” or “prepossession” of the mind by unquestioned beliefs and principles, he speaks of the *force* and *sincerity*, the *candor* and *ingenuity*, and the *courage* we need to muster in order to expose our beliefs, and implicitly our selves, to renewed scrutiny.⁸¹

It is precisely such scrutiny that Locke recommends in his *Conduct* under the title “examination.” There is a double thrust to this term: it encompasses both the examination of principles (so that none but those that are proven solid may be embraced)⁸² and the examination of oneself (of the “motions of the mind” involved in the various defects of the understanding, of the passions as they bear on the conduct of thinking, of the laziness or precipitation of one’s assent).⁸³ The *Conduct* itself is just such an example of an examination of the multifarious distempers observed to hinder the rightful operation of the understanding. As such, this text also emphasizes the *practical* difficulty involved in the regulation of assent, of which the *Essay* offered a theoretical doctrine, together with general prescriptions for its good functioning:

In the whole Conduct of the Understanding, there is nothing of more moment than to know when and where, and how far to give Assent, and possibly there is nothing harder. 'Tis very easily said, and no body questions it, That giving and withholding our Assent, and the Degrees of it, should be regulated by the Evidence which things carry with them; and yet we see Men are not the better for this Rule; some firmly imbrace Doctrines upon slight grounds, some upon no grounds, and some contrary to appearance. Some admit of Certainty, and are not to be mov'd in what they hold: Others waver in every thing, and there want not those that reject all as uncertain.⁸⁴

Locke rehearses here the rule for regulating assent formulated in the *Essay* but offers a new, practical perspective on it. It is a good rule, he thinks, that correctly represents the task of the understanding in judgment and that can serve as the general regulative principle of its conduct. But rules do not make people good (or good thinkers) by themselves. What is needed, Locke thinks with the whole *cultura animi* tradition, is an incorporation of the rules in the behavior and character (the ethos) of the person through exercise and practice: "Practice must settle the Habit of doing without reflecting on the Rule."⁸⁵

The operations of the mind required for right reasoning ("sagacity" and "illation") are, Locke thinks, natural to the mind (a "native faculty"), and natural reason is a "touchstone" that can be relied upon to distinguish truth from falsity.⁸⁶ There is also a natural affinity between mind and truth: the mind has a "natural Relish of real solid Truth,"⁸⁷ "nothing being so beautiful to the Eye, as Truth is to the Mind."⁸⁸ But Locke often works with the two senses of "natural" characteristic of the doctrines of the cure and cultivation of the mind: the natural-healthy and the natural-distempered. The distance between the two, for him, is measured by the presence or absence of *exercise*. The mind's powers are also naturally (in the second sense) "extinguished" by lack of exercise, which accounts for all its defects and miscarriages.⁸⁹ They are "starved by disuse, and have lost that Reach and Strength which Nature fitted them to receive from Exercise."⁹⁰ It is thus only with constant practice that the mind is gradually fortified, made attentive and capable of "close thinking."⁹¹ The outcomes of a rightly conducted practice of the mind are such as to fit Locke's own description of the rational creature's task and duty toward her Creator: the mind will be strengthened, the capacities enlarged, the faculties improved, and the whole effort "leads us towards Perfection."⁹²

The idea of the "incorporation" of rules through habituation receives support from the analogy between mind and body that served the same purpose for Bacon, Charron, or Boyle: Locke writes that "as it is in the

Body, so it is in the Mind; Practice makes it what it is" and builds its "Excellencies."⁹³ Just as the body is trained into the appropriate habits in writing, painting, dancing, or fencing, so the mind's reasoning needs to be exercised "in observing the Connection of Ideas and following them in train."⁹⁴ As we have seen, Locke insists that correct ("natural") inference and attention become habitual through practice and exercise. To the same semantic area belongs the representation of reading and understanding as "digestion" or "rumination." In thinking as in reading, one needs to trace arguments to their foundation, observe the coherence of the argumentation, and thus transform ideas into the matter of one's own mind: "We are of the ruminating Kind, and 'tis not enough to cram our selves with a great load of Collections, unless we chew them over again, they will not give us Strength and Nourishment."⁹⁵ Locke's pedagogical recommendations in *Some Thoughts concerning Education* (1693) are also built on the principle of habituation. In the teaching of languages and sciences, Locke writes, the tutor's business is to "form the Mind of his Scholars, and give that a right disposition."⁹⁶ The method suited to that end is the training of their understanding by degrees, so that advances in understanding ideas and their connections are made only once the matter at each step is fully grasped and absorbed.⁹⁷ The education of the mind's powers in early childhood has, for Locke, the virtue of a regimen for regulating assent; it "set[s] the *Mind* right, that on all Occasions it may be disposed to consent to nothing, but what may be suitable to the Dignity and Excellency of a rational Creature."⁹⁸ The exercise, cultivation, and improvement of the reasoning faculty, Locke believes, is "the highest Perfection, that a Man can attain to in this Life."⁹⁹ And it is the grooming of this faculty into a habitual right reasoning that builds both the self-mastery and the suppleness of the mind, and is thus the bedrock of its freedom.¹⁰⁰

The formation of habits of right reasoning is closely allied, in Locke's thought, not only with the general moral-cum-intellectual dispositions (the sincerity, candor, or courage mentioned above) and the training of attention, but also with the cultivation of the right emotions needed in inquiry. In his pedagogical reflections, for instance, he speaks of a love of knowledge that needs to be bred in the young child through the tutor's efforts. Accustoming the child to using his own judgment will serve both the incorporation of rules (which will thus "go down the easier, and sink the deeper") and the nurturing of a liking for study and instruction; the child will thus "begin to value Knowledge."¹⁰¹ In commenting on the curriculum of arts and sciences he recommends, he concludes that

the tutor's business is "not so much to teach him [the child] all that is knowable, as to raise in him a love and esteem of Knowledge."¹⁰² Elsewhere, Locke similarly speaks of the "preparation of the mind" with a love of truth. Such love, as he writes in the fourth edition of the *Essay*, breeds the commitment of pursuit and the concern about the outcome of the endeavor of a true inquirer: "He that would seriously set upon the search of Truth, ought in the first Place to prepare his Mind with a Love of it. For he that Loves it not, will not take much Pains to get it; nor be much concerned when he misses it."¹⁰³ A desire for truth is also, he writes in the earlier "Of Study" an orienting emotion involved in impartial inquiry: "Our first and great duty, then, is to bring to our studies, to our enquiries after knowledge, a mind covetous of truth, that seeks after nothing else, and after that impartially, and embraces it how poor, how contemptible, how unfashionable soever it may seem."¹⁰⁴

Locke's *love of truth* is as loaded a term as his *attention*. It involves both a view about the affinity between mind and truth and a conception of the love of truth as a virtuous emotion of inquiry. He thinks that the mind has "a natural Relish for real solid Truth." This "relish" is nevertheless lost with such practices as the scholastic custom of arguing on any side of a question, "even against our Persuasion," and of maintaining "that side of the Question they have chosen, whether true or false, to the last extremity; even after Conviction."¹⁰⁵ This practice destroys right understanding, which he defines as "the discovery and adherence to Truth."¹⁰⁶ There is a direct connection between the "relish" for truth and the mind's "adhering" to it in the right way: in his view, scholastic disputation is a corrupting practice that blocks that "adherence," baffles the mind, and thus obliterates the love of truth. In contrast, it is implied, the cultivation of a love of truth maintains and strengthens the mind's natural orientation toward truth and ensures its adherence to it in right judgment. Similarly, the love of truth appears as that which is flouted in irregular assent: the disproportion between assent and evidence, or the "surplusage of assurance is owing to some other Affection, and not to the Love of Truth." Conversely, the very mark of a lover of truth is a regulated assent, or "the not entertaining any Proposition with greater assurance than the Proofs it is built upon will warrant."¹⁰⁷ Locke wrote these lines in the chapter on enthusiasm that he added to the fourth edition of the *Essay* in 1700, which is to say, after he had written both the account of error in the first edition (1690) and that in the *Conduct* (1697). I suppose therefore that he can safely be taken to mean "some other Affection" as a shortcut to the whole array of weaknesses and distempers of the mind charted in those

accounts. The love of truth, which made a summary appearance in his earlier writings, becomes thus in his late thought a fully developed notion that stands for one of the virtues of rightful inquiry.

Although Locke never makes the connection explicit, I believe he can be implicitly taken to envisage a close link between the love of truth and attention. Attention is a passionate sort of activity of the mind. All human activity, of body, will, or understanding, Locke writes, is spurred by the two fundamental passions, pleasure and pain. Considered and attentive inquiry, for instance, is possible owing to a “perception of Delight” joined by God to our thoughts, which provides both energy and orientation (“direction or design”) to our cogitation. In its absence, man remains an “idle unactive Creature,” with ideas floating in his mind like “unregarded shadows.”¹⁰⁸ Seen in light of his list of degrees of thinking, this comment suggests that for Locke the degrees of attention in thinking are also degrees of passionate activity in the mind. Consequently, the training of attention is a training of a mental mechanism that combines cogitation and passion. But if attention is activated by an orienting “perception of delight,” the love of truth may be seen as the orienting emotional disposition involved in the habitual mastery and direction of thought toward the right object. On the other hand, since *all* kinds of mental activity are spurred by the master passions, Locke may be taken to suggest that the “perception of delight” that puts the mind in motion is a neutral descriptor that in its actual manifestations takes either the form of mismanaged (untrained) activity, as in the distempered behavior of the mind (expressed in its precipitation), or the form of trained activity, as in the healthy or else fully “rational” behavior of the mind, capable of attention and oriented by the love of truth. Untrained activity is responsible for the distempers of the mind (as is, actually, laziness or idle passivity), while trained and rightly oriented activity is responsible for the health of the mind.¹⁰⁹ Love of truth and attention name thus a virtuous disposition of the mind that is jointly cognitive and passionate, and their cultivation acts as a regulative instrument countering the similarly hybrid cognitive-passionate complexion of the distempered mind.

Love of truth and examination: the rule turned into a portrait

In the *Conduct*, we have seen, Locke reconsiders the *Essay* rule for regulating assent from a marked practical perspective and insists on the need to incorporate the rule into one’s life through exercise and habituation. There is a second rehearsal of the rule in the same text, which offers yet

another vantage point on his approach to rightful inquiry. This second formulation adds the love of truth to the requirement of examination:

In these two things, viz. an equal Indifferency for all Truth; I mean the receiving it in the Love of it as Truth, but not loving it for any other reason before we know it to be true; and in the Examination of our Principles, and not receiving any for such, nor building on them 'till we are fully convinced, as rational Creatures, of their Solidity, Truth and Certainty, consists that Freedom of the Understanding which is necessary to a rational Creature, and without which it is not truly an Understanding.¹¹⁰

The call for the examination of principles is a variant of Locke's rule for regulating assent. What he adds here is, first, a pointed reminder that the improvement of the reasoning faculty thus conducted goes into the *making* of a "rational creature," and, second, an interpretation of examination as a work guided by "indifferency." "Indifference" here has the same meaning of lack of enslavement to distempers as we have encountered before in the virtuosi's texts. Locke reinforces the term by translating it as the very love of truth that, for him, counters the other "affections" of the mind: it is a disposition of seeking and receiving truth for the love of truth (rather than for some other love).¹¹¹ All the miscarriages of the understanding—passions, inclinations, or weaknesses—are as many seductions to one's mind, continuously alluring it to rest its course and take refuge in the "quiet Enjoyment of the Opinion he is fond of."¹¹² To be indifferent to them is to steer your quest for truth until it reaches truth rather than your own self. Locke's regulation of assent takes the form of this very quest for truth, geared by "indifference": it is under its guidance that we become able to "receive and imbrace [opinions] according as Evidence, and that alone gives the attestation of Truth."¹¹³

Indifference thus understood is also the guiding virtue of study. Against the vanity and narrowness of a "little Mind," which becomes "tinctured" with an individual's own preferred study, Locke recommends a "universal tast of all the Sciences, with an indifferency before the Mind is possess'd with any one in particular, and grown into love and admiration of what is made its darling."¹¹⁴ Locke's advice on study is continuous with his precepts for the cultivation of judgment in general: protecting the mind from ("amorous") possession (of ideas or of sciences), and pursuing knowledge in mind-regulating love of truth.

With the coupling of examination and love of truth, Locke performs a significant transformation of his rule. The rule is in fact no longer a rule proper, but becomes a portrait of the rightful inquirer: the passage quoted

above is the conclusion of a description, rather than definition, of what “examination” and “indifference” look like, which is introduced by the statement that this is what “he that would acquit himself in this Case as a Lover of Truth” should be expected to do.¹¹⁵ The portrait paints an exemplary *figure* that is shown, so to speak, in action: examination and search after truth for the love of it are what the lover of truth *does*. It is also, owing to the inscription of the exemplary figure in an anatomy of the distempered mind, a portrait of the exemplary *temper* or mental disposition that makes the truly rational creature: at the end of the section we are told that what has been described is the “right temper of the Mind,” which protects it from self-imposed slavery.¹¹⁶ Indeed, the point of the quoted passage is to tell us what the “Freedom of the Understanding,” seen as the temper of a rational creature worthy of the name, consists in.

Locke’s rule has thus taken on a significance that preserves little similarity with a rule for justifying belief. The justification-of-belief approach concentrates on the success or failure in assessing evidence and in accepting or rejecting propositions on that basis. It works with acts of belief as results of such assessments and with a notion of a logical relation between “evidence” and “justification.” It thus leaves out what is crucial to Locke’s account: the distempered or healthy state of the human mental powers, and the notion that healthy assent giving is the result of a program of educating those powers and of cultivating virtuous habits of mind. When the mind is corrupted by infirmities and starved by disuse, the degree of assent will go beyond evidence because the mind will embrace its “darlings” with an “Excess of Adherence.”¹¹⁷ But if the mind is free of distempers, the force of well-gathered and well-examined evidence will weigh naturally on the mind in the due degree.¹¹⁸ Here it is persuaded, there it is seduced. Locke is not interested in making his prescription more formal or rule-bound than this.

Right reasoning, for Locke, cannot be the result of the observation of rules. If right reasoning means, as it does for him, a natural operation of sagacity and illation that can come to function properly only if the weaknesses of the mind are overcome and certain mental dispositions cultivated, rules can do little for the task. Locke does formulate a rule for regulating assent, but his rule indicates, even in the theoretical formulation of the *Essay*, a summary of the work the mind has to perform, rather than prescribe a logical ratio between evidence and justification. The *Conduct* fleshes out that summary indication and reinforces the practical nature of the program for educating the mind’s powers. It also makes it clear that at stake in Locke’s recommendations for governing judgment are not belief and its justified status, but the thinker and his intellectual

virtuous habits. These prescriptions are thus best digested in a portrait rather than in a rule.

The figure of the lover of truth is a discreet presence in the *Essay*, but its importance to Locke is signaled by his identification of himself as such a figure in the opening chapters.¹¹⁹ It becomes more prominent in the *Conduct*, where Locke develops the practical consequences of his theory of assent and its regulation. In highlighting the portrait of the lover of truth over and above epistemic rules, Locke moved firmly toward a conception of the *character* of the rightful knower, and of his personal epistemic excellence, rooted in virtuous habits of the mental powers, cognitive and affective alike. Locke's views on the conduct of the understanding came thus to fall in the mold of a *cultura animi* program for nurturing the human mind, which answered well his need for a framework in which to articulate his persistent concern with the duty of a rational creature toward her Creator. The search for truth taken up as such a duty was the vision within the compass of which he gradually spelled out his notion of what *it meant* for a human being to be engaged in the search for truth. The project of the *Essay* is largely inscribed in this vision. It can thus be read with an eye to its sketch of what the virtuous knower does and is like, which becomes fully fledged in the *Conduct*.

Regulative epistemology and the ethics of belief

The preeminence of the figure of the knower and his virtuous dispositions in Locke's thought argues for its alignment not only with the early modern *cultura animi* tradition but also with recent developments in what has been called virtue epistemology. In contrast with theories of rational belief that take belief itself as the object of evaluation, virtue-based epistemic theories, as Linda Zagzebski has put it, "shift the locus of evaluation from the act/belief to the virtue."¹²⁰ Virtues of the mind, or intellectual virtues, may be conceived on the model of the more established, traditional moral virtues, although, as she argues, the moral-intellectual dichotomy is hardly tenable on account of the fact that both involve cognitive as well as affective states; that both can be acquired by training; and that there are logical and causal connections between the two types of virtues in the actual performance of epistemic agents.¹²¹ The virtues of the mind are, just like the moral virtues, "excellences": they are deep traits of character, acquired through training and habituation, and defining for who a person is.¹²²

An even more pronounced emphasis on the person's virtues and character has been proposed in Robert C. Roberts and W. Jay Wood's project

for what the authors choose to call “regulative epistemology.” Theirs is a virtue epistemology that has swerved from analytical to regulative purposes. As such, it deals not with logical definitions that may build a theory of knowledge (even if a virtue-epistemic one), but with the more “messy . . . logic of concepts that govern the intellectual life,” which may guide epistemic practices.¹²³ Significantly, the authors see their project as a return to what they call the seventeenth-century tradition of regulative epistemology, which “describes the personal dispositions of the agent rather than providing direct rules of epistemic action.”¹²⁴ Descartes and especially Locke are highlighted as exponents of this tradition.

The notion of a Lockean regulative epistemology was first put forward by Nicolas Wolterstorff in his 1996 study of Locke’s “ethics of belief.” Wolterstorff rightly argues that Locke’s doctrine of the governance of belief in book IV of the *Essay* and in the *Conduct* was not about defining a criterion for entitled belief but about “proposals of reform of doxastic practices.”¹²⁵ Nevertheless, in discussing Locke’s account of the “wrong measures of probability,” Wolterstorff does still largely work with a belief-based epistemological theory of justification, although he introduces a cogent discussion of Locke’s “wrong measures” of assent as “wounds of the mind.”¹²⁶ Yet the ethics of belief discussed by Wolterstorff is still mainly about moral obligation concerning beliefs, not persons. The heart of the discussion is the question of the “voluntariness of belief,” on which doxastic responsibility is said to be premised.¹²⁷ Concerning this question, it is surely the case that, as Michael Losonsky has very well argued, belief, or rather assent, is voluntary for Locke in the sense that it is shot through with desires, passions, and loves.¹²⁸ But this does not mean that belief is voluntary in the sense that we have control over our beliefs or over the degrees of confidence with which we assent to propositions, in the manner of a determination by momentary, punctual acts of will (as suggested by the ethics-of-belief approach). The control Locke advocates is indeed, as Wolterstorff also admits, a control over our epistemic practices: the work on the mind is indeed in our power (although, Locke adds, few live up to the task). Praise or blame, and thus responsibility, on his account, are attached not to acts of belief but to the disposition of the mind acquired by means of a regimen of practices.

The ethics-of-belief approach to Locke has also suggested that there is a tension between his “official vision”—a “luminous” conception of the unproblematic, mechanical determination of the rational faculties by the ultimately transparent force of the evidence—and a “dark” conception of the behavior of an irrational, wounded mind.¹²⁹ On the former vision, belief would be passive and intellectual, but on the latter, it would be

voluntary (under the will's decision) and thus liable to moral praise or blame. Locke would have liked to maintain his (Enlightenment) view of reason, luminous and mechanical, yet he reluctantly had to "undermine," "darken," and really "deconstruct" his own vision by allowing other forces (passionate, irrational) to undermine reason's dominion.¹³⁰ The sections in the *Essay* that, on this account, are at the heart of the tension are IV.xx.15 ("What Probabilities determine the Assent") and IV.xx.16 ("Where it is in our power to suspend it"). Locke's discussion of the *determination* of assent by the greater probability seems to be inconsistent with his inventory of types of flawed assent-giving *contrary* to probability. But the "determination" of assent is premised in Locke's discussion on the existence of serious, careful inquiry and examination, which, I believe, carries for him the load of the training regimen I have described.¹³¹ We might well fail in this task and consequently fall into error; but then error is seen not as the result of a punctual will-based decision, in turn due to irrational forces, but as the expression of a failed regimen, which is indeed in our power. At stake, thus, is not the question of whether we can choose to assent or not—which is actually, as Losonsky has shown, a question of the freedom rather than of the voluntariness of belief¹³²—but the question of the rightful or failed training of the mind's powers. The "tension" in question is more properly seen therefore as the expression—within a unified and internally consistent doctrine—of the distance between the healthy and the distempered disposition of the mind, a distance that measures the territory of an educational effort.

For Locke, both distempers and health are "natural" possibilities of human reason, and both involve cognitive, conative, and moral aspects. He conceives of the passage from distempers to health as a course of training: a curative and cultivating regimen, geared by attention, sincerity, candor, courage, love of truth, and the habituation to examination and right reasoning, and whose purpose is a strengthening and good orientation of the (passionate) activity of the mind. This program of training is meant to educate man into becoming a rational creature, which Locke identifies as the Christian's (and the Christian philosopher's) duty. That duty traces the sphere of a moral obligation not for beliefs, but for believers.

The discourse with a friend

The advocacy of the duty to use one's mind well and engage in the patient and severe work of the understanding has as a counterpart in Locke's thought a recognition of human frailty and of the need of communal

help: “we should do well to commiserate our mutual Ignorance, and endeavour to remove it in all the gentle and fair ways of Information.”¹³³ The critique of dogmatism, which he shares with the other virtuosi, is extended into a defense of the toleration of other opinions based precisely on a conception of the difficult labor of the understanding required for a rightful regulation of assent. To try and impose your doctrines on others is to deny them that labor and expect a “blind resignation” to your authority; it is also most probably the result of a neglect of that labor on your own part, an “imposition” on your own mind. It would thus “become all Men to maintain *Peace*, and the common Offices of Humanity, and Friendship, in the diversity of Opinions.”¹³⁴ The social dimension of Locke’s epistemological thought embraces thus both the negative attack on dogmatism and imposition and the positive defense of the benefits of friendship and humanity. John Marshall has brought to light the extent to which Locke’s moral and social thought was informed by the Ciceronian doctrine of offices: the Restoration gentlemen, of whom he was one, were bound by obligations of beneficence, gratitude, and liberality, and Locke self-consciously cultivated a Ciceronian *amicitia* in his personal friendships and correspondence.¹³⁵ But friendship was also important to Locke’s conception of the labor and duty of the search for truth. The friend is someone who can wisely tolerate your opinions; but he is also, more significantly for this discussion, a key figure in the process of the education of your mind: he is the generous, if severe, monitoring instance who can assist your labor of understanding. He thus serves the same function as the “wise friend” in the *cultura animi* and virtuoso literature.

In “Of Study,” Locke advised a summoning of “all our force and all our sincerity” in disengaging ourselves from the “prepossessions” of our minds and submitting them to scrutiny. He added that this trial was best performed with “the assistance of a serious and sober friend who may help us sedately to examine these our received and beloved opinions.”¹³⁶ The friend’s help is expected to make us aware of the very mechanism of the interpenetration of beliefs and self-serving loves (he will show you the “darlings of our minds” and their “defects”), and thus it completes the work of self-examination involved in the drawing of the history of our distempers. Locke is of a mind here with, e.g., Wright’s designation of “wise friends” as providing the best help against your self-love, or with Hooke’s commendation of the community of virtuosi as an aid in taking you out of the private cell of the idols of your mind. A “knowing judicious friend,” Locke wrote to William Molyneux, is in fact an image of the lover of truth: a model thinker whose conversation will “try” your ideas, since he “carries about him the true touch-stone, which is love of truth in

a clear-thinking head."¹³⁷ The "discourse with a friend" can thus be represented as a practice of ordering the mind, even in the spatial sense of the term, which completes the solitary effort of reading and meditation:

Reading, methinks, is but collecting the rough materials, amongst which a great deal must be laid aside as useless. Meditation is, as it were, choosing and fitting the materials, framing the timber, squaring and laying the stones, and raising the building. And discourse with a friend (for wrangling in a dispute is of little use) is, as it were, surveying the structure, walking in the rooms, and observing the symmetry and agreement of the parts, taking notice of the solidity or defects of the work, and the best way to find out and correct what is amiss.¹³⁸

The combination of solitary and conversational self-examination is also involved in the explorations and interrogations of the *Essay* itself. On the one hand, this work can be seen, in Rosalie Colie's words, as the result of Locke's "own lifelong assaying of himself and of the human understanding, the record of his own experiment in understanding."¹³⁹ The pursuit of knowledge is a process organized around the person of the knower, who appears both as the principal "experimenter" of this way of life and as the mirror in which the reader may recognize an image of life worth pursuing. On the other hand, the *Essay* is also largely framed as a conversation between author and reader, and thus as a framework for both the author's and the reader's effort of examination and discipline of thought. As Peter Walmsley has put it, the *Essay* is a work that casts the reader in the role of the interlocutor with which the speaking persona engages in an often resumed dialogue meant to interrogate and reformulate claims, thus "bringing the drama of the reader's assent to the fore."¹⁴⁰

Another figure of the friend is the tutor in Locke's pedagogical reflections. Just as in the case of the friend, this was an office that he fulfilled in his own life: he was an Oxford and subsequently a private tutor to several gentlemanly and noble families, and his advice was sought and praised. The education of a child, he tells us in his pedagogical essay, can hardly go right in the absence of "discreet" persons around him, among whom foremost are the father and the tutor. The tutor in particular is described by Locke as a paradigmatic model of wisdom and virtue (a "*Discreet, Sober, nay, Wise Person*" endowed with "*great Sobriety, Temperance, Tenderness, Diligence, and Discretion,*")¹⁴¹ a careful observer of the child's temper,¹⁴² an able guide of his developing sense of morality and reasoning powers, and a sincere companion in conversation.¹⁴³ He will be able to detect the child's "natural wrong Inclinations and Ignorance"¹⁴⁴ and will manage, through his exercises and conversation, to turn them to "contrary

Habits"¹⁴⁵ and thus build the virtuous dispositions of the mind requisite for both civility and good judgment.

The friend and the tutor, in sum, share their office with that of the physician of the soul: for them, the husbandry of the soul is the main rule of philosophy and religion alike. They are variants of the Lover of Truth, who is Locke's equivalent figure to Boyle's Christian Virtuoso. Both are engaged in a search for truth, which is deemed capable of ordering the mind and shaping a Christian philosophical life. The domains of study in which this search for truth is expected to bear both cognitive and moral fruit will be the subject of the next two chapters.

Studying Nature

Lived physics

In its ancient shape, the *cultura* and *medicina animi* often reserved an important place for the study of nature. The knowledge of the self and the knowledge of nature stood in close relationship at the core of the art of living. For the Hellenistic schools, as Pierre Hadot has shown, the discipline of assent was foundational for the whole paideic program and corresponded to the practical exercise of logic (a “lived logic”). Conjoined with it was a “lived physics,” understood as a discipline of desire: by attentively studying nature, the inquirer gradually comes to self-mastery and submission to the god’s will.¹

In the first part of his *Usefulness of Experimental Natural Philosophy* Boyle expresses similar sentiments, filtered through a Christian understanding of man’s duty to his Creator, in a defense of the religious and cultivating value of the study of nature. He quotes ancient philosophical and patristic sources, biblical sages and Eastern traditions of wisdom, with which he shares the notions of nature as divine creation and of man’s duty to contemplate it and admire its divine workmanship. Thus understood, the study of nature is a way to “*Improving Mens Understandings*” and to increasing their religious devotion.² It is therefore most properly seen as a philosophy of God’s works.³ The understanding of the experimental study of nature as a religious activity was commonplace among the English virtuosi, and it, too, had Baconian credentials. For Bacon, philosophy performs a service to religion, which is expressed in our “consider[ing]

and magnify[ing] the great and wonderful works of God” and in its “drawing us into a due meditation of the omnipotency of God, which is chiefly signed and engraven upon his works.”⁴ In his *Usefulness* Boyle approvingly quotes Bacon’s dictum that “a little or superficial taste of Philosophy, may, perchance, incline the minde of a Man to Atheism, but a full Draught thereof, brings the Minde back again to Religion”⁵ and places it among similar statements by Galen, Hermes Trismegistus, and Paracelsus. Similarly, in the *Essay*, Locke assures his readers that although we might never be able to penetrate the essences of things, the study of nature is a valuable enterprise since the “Contemplation of his [God’s] Works gives us occasion to admire, revere, and glorify their Author.”⁶

The consolatory works of practical divinity written by promoters or supporters of the experimental philosophy develop similar ideas. Thus, in *Discourse concerning the Beauty of Providence* (1649), John Wilkins advocates a work of patient and diligent observation of both nature and historical providence, seen as similarly complex structures of divine contrivance: such work has the value of an exercise for controlling passions and immoderate desires, for learning humility and submission to the will of God.⁷ In his *Peace and Contentment*, Peter Du Moulin also thinks that natural philosophy is the one science that “will be sure to stick unto the separat soul” since the naturalists (among whom Bacon, “my Lord of St. Albans,” is the prime example) deal directly with God’s works and are engaged in a “contemplation” that “perfects” the rational soul.⁸ In the apologetic conclusion to his *Experimental Philosophy* (1664), Henry Power paints the image of the new philosophy in similar colors: “Certainly this World was made not onely to be Inhabited, but Studied and Contemplated by Man.” The employment of reason in this course of study—which Power calls a “Rational Sacrifice” most pleasing to God (cf. Romans 12:1)—is what advances the essence of our humanity: it “transpeciates our Natures, and makes us little lower than the Angels” (cf. Psalms 8:5). It behooves us, therefore, as part of the duties we have as created human beings, to see to “the right management of this Faculty.”⁹

These texts suggest that the religious value of the study of nature as the experimentalists understood it rested on the idea of an improvement and growth of the powers of the mind. My concern in this chapter will be to show how Boyle and Locke develop this theme and how in so doing they elaborate a rationale for the role of the *experimental* study of nature in cultivating the mind. The key conception grounding this rationale—which both philosophers maintain is equally supported by reason and revelation—has to do with the relation between the created world and the hu-

man mind. In brief, the conception is the following: There is a wise order and contrivance in the structure and government of the world. We have some ability to discern that order and contrivance, although it is beyond human capacity to comprehend its full scope and inner recesses. There is, then, both a match and a disproportion between mind and world. The notion comprises both the claim that the human mind has some ability to discern the complexities of the whole since it is *meant* to engage in that discerning activity, and the claim that there are vast regions of it that remain obscure to the mind. This conception—which combines ontological and anthropological tenets with a prescription for the legitimate conduct of the mind in the pursuit of knowledge—informs both the methodology of experimental investigation and the natural theological framing of this type of study.

The disproportion between mind and world indicates that knowledge of nature cannot be the result of metaphysical speculation but must come with information from sources outside the mind, i.e., from the observed world itself (the stuff of “experience”). On the other hand, such knowledge is possible, at the level permitted to the human faculties, owing to the match between world and mind. Nevertheless, one caution that the disproportion entails is that natural knowledge can never be complete and is always in need of revision. Legitimate natural inquiry, therefore, is such that it does not seek the security of definitive answers but is continuously resumed. Similarly, the match between mind and world makes it possible for the inquirer into nature to discern—to some extent—the divine attributes expressed in creation and thus to engage in what was to be called “physico-theology.” But it is actually on account of the disproportion that the mind is said to be able to become aware of and admire the ultimately inscrutable attributes of God, as well as to acknowledge its duty to try and grasp as much of them as it can. Here, too, the search should never be arrested. Thus understood, the search is said to involve a renovation of the mind’s powers, both cognitive and affective. From this perspective, I will argue, experimental methodology and physico-theology are construed as transformative exercises for the inquirer’s mind. I will also suggest that, owing to the value placed on the *always resumed search* into nature and into the divine attributes expressed in it, assumed as the duty of a Christian philosopher, the disproportion in question is actually, in a sense, part of the match. It is this nuanced understanding of disproportion that grounds the idea of the virtuous experimental search, which informs both natural philosophical inquiry and natural theological exercise.

This is also to say that my emphasis will be on the figure of the inquirer into nature, rather than on natural philosophical methodology and natural theological argument for their own sake. In fact, the suggestion will be that an approach from the point of view of the inquirer is apt to add important dimensions to methodology and argument, and to show how they are moored to the two philosophers' general concern with the rightful conduct of the understanding.

The appropriateness of disproportion

In chapter 4 I claimed that Boyle's paideic understanding of experience, as epitomized by the virtue of docility, rested on a foundational view about the fecund richness of the world and the ignorant but teachable nature of man's intellect. The fecundity of nature, it will be seen here, is a notion that Boyle associates with the divine attribute of wisdom, which grounds his conception of nature as an exquisite structure of interrelations. It is in explaining what he understands by God's wisdom that, in his *Usefulness of Experimental Natural Philosophy*, he introduces the notion of the "Aggregate or System of all Natural Bodies." The image of the clocklike or engine-like "system" of nature seems to be an elaboration on the biblical reference to the "manifold wisdom of God," which he cites several times.¹⁰ The aim of this text is to defend natural experimental philosophy against accusations of atheism, and a considerable part of it is dedicated to the detailed (one might say pictorial) illustration of the "curious Engines" and the "skilful Contrivances" of which the "exquisite and stupendous Fabrick of the World" is made.¹¹ The metaphors of "system," "aggregate," and "engine" are of course apposite to Boyle's understanding of the world of nature as a supremely complex mechanism. In his later *Free Inquiry into the Vulgarly Receiv'd Notion of Nature*, he develops the image (while including perhaps unexpected organic analogies):

I consider the frame of the World already made, as a Great, and, if I may so speak, Pregnant *Automaton*, that, like a *Woman* with *Twins* in her *Womb*, or a *Ship* furnish'd with *Pumps*, *Ordnances*, &c. is such an *Engine* as comprises, or consists of, several lesser *Engines*. And this *Compounded Machine*, in conjunction with the *Laws of Motion*, freely establish'd and still maintain'd, by God among its *Parts*; I look upon as a *Complex Principle*, whence results the settled *Order*, or *Course*, of things *Corporeal*.¹²

This picture, Boyle says, is in conformity with a "probable" conception of the creation of the world, which builds on a scenario already

announced in the *Usefulness*: in his “infinite Wisdom and Power,” God created a universal and undistinguished matter and established the rules of motion whereby matter became divided into parts characterized by various sizes, figures, and relative positions. By God’s initial guidance, these parts in motion, together with the “seminal principles” of the seeds of living things, came to form the world as we know it. By God’s continuing guidance—his “ordinary and preserving *Concourse*”—the laws of local motion effective among the parts of matter are maintained in operation, so that the “great Construction, or System and Oeconomy” of the world is preserved and the species of living creatures are propagated.¹³

According to Boyle’s “corpuscularian hypothesis,” the various parts of matter are characterized by the “mechanical affections” of shape, size, motion, situation, and texture, in terms of which their various qualities and powers may be explained.¹⁴ The parts are, moreover, so closely interconnected that any one part can be what it is only because of its relations to the other—neighboring or remote—parts of the “great Automaton.” Any such part, as Boyle’s experiments with the air pump illustrated, “needs the Assistance, or Concourse, of other Bodies, (which are external Agents) to perform divers of its Operations, and exhibit several *Phaenomena*’s, that belong to it.”¹⁵ The qualities of physical bodies, he explained in *The Origin of Forms and Qualities* (1666), have a “relative nature,” proceeding from the insertion of any single body within the complex whole of the universe. The universe is a vast network of “locks and keys” fitted one to another in such a way that any one part can act upon, and can be acted upon by, the other parts. The qualities stand for these actions and are not themselves real entities; against Aristotelian scholastic philosophy, Boyle argues that qualities are no more than expressions of relations.¹⁶ Similarly, in *Cosmical Qualities* (1671), he writes: “the Qualities of particular Bodies . . . do for the most part consist in Relations, upon whose account one Body is fitted to act upon others, or disposed to be acted on by them, and receive Impressions from them.”¹⁷

Locke closely echoes Boyle’s picture of the world as a grand system of relations, similarly embraced as a “probable” doctrine. Locke’s aim here is to argue that we can have only imperfect ideas of substances, since the qualities we gather in our complex ideas of them depend on multifaceted relations and concatenations of causes that, by their vastness and complexity alone, are bound to remain, in their entirety, unknown. The parts of the “stupendious Structure” of the universe “may, for ought we know, have such a connexion and dependence in their Influences and Operations one upon another, that, perhaps, Things in this our Mansion, would put on quite another face, and cease to be what they are, if

some one of the Stars, or great Bodies incomprehensibly remote from us, should cease to be, or move as it does."¹⁸ For instance, if a piece of gold were artificially separated from its surroundings, the qualities of color, weight, even perhaps malleability would no longer be manifested; water, if similarly isolated, would no longer exhibit what appears to be its defining quality, fluidity; so with vegetables and animals, we need to see that what we take to be their intrinsic qualities (such as life or motion) depend to a large extent on causes and qualities of other bodies.¹⁹

One lesson that Boyle and Locke draw from this (probable) picture of the world has to do with the limits of our cognitive powers: the extent and complexity of the web of relations in the cosmic structure exceed by far the human capacity of comprehension. For Locke, this is indeed the context of his discussion of the system of the universe: our ideas of substances and real essences are imperfect, and the realization should make us aware of the fact that "we are so far from being admitted into the Secrets of Nature, that we scarce so much as ever approach the first entrance towards them."²⁰ His repeated claim in the *Essay* is that natural philosophy cannot hope to become a *scientia* (or demonstrative science). Not only does the complexity of the interrelations in the universal system exceed our comprehension, but we have no way of deciding on the necessary status of such relations. The corpuscularian hypothesis is, indeed, highly intelligible, yet it cannot discover "what Qualities and Powers of Bodies have a *necessary Connexion or Repugnancy* one with another."²¹ This passage is shortly followed by a reference to "the Endowments and Perfections of Cherubims, and Seraphims, and infinite sorts of Spirits above us," which is meant, here as in a number of other places, to mark a sharp contrast between man's limited faculties and the "endowments" of the higher spirits, which possibly allow them precisely the kind of knowledge of essences denied to man.²² Thus, not only does Locke maintain an (unreachable) ideal of a demonstrative science of bodies, but he extracts this science from its abstract realm and relocates it, so to speak, in his chain-of-being ontology: a science of bodies is not simply an ideal tout court but a kind of knowledge ascribed to a specific position on the scale of intelligences.

Boyle also associates the picture of the great automaton with a lesson about human ignorance, and he, too, draws the comparison with the capacities of the angels: in his *Usefulness*, he warns that although the corpuscles' size, figure, motion, and the qualities resulting from them may be supposed to produce the perceived natural phenomena, yet a naturalist is far from being able to identify and explain the particular causes of a particular effect. Explanation, Boyle warns, is different from,

and more difficult to obtain than, intelligibility. Crowning these pieces of warning is an expostulation about the dim powers of the human intellect and the vanity of those who suppose that the “immense Wisdom” of the “Author of the Universe” should, “in his Creating of things, have respect to the measure and ease of Humane Understandings, and not rather, if of any, of Angelical Intellects.”²³ Boyle never goes the length of Locke’s pessimism about the prospects of natural philosophy and is actually hopeful that advances toward the discovery of the “essences” are possible. But like Locke, Boyle emphasizes man’s limited powers, much more impotent than those of the superior intelligences, and infinitely so compared with God’s wisdom. Man’s dim intellect is disproportionate to the fecundity of the world.

The disproportion between man’s mind and the world, therefore, is addressed by the two philosophers in the context of their understanding of God’s attribute of *wisdom* as expressed in the supremely complex architecture of the world. I believe this calls into question the interpretation of Boyle’s views on the limits of reason as uniquely linked to his conception of divine *power and freedom of will*, attributed to his “theological voluntarism.” In the words of Margaret Osler, Boyle’s “insistence that God’s will is not constrained by anything in the creation was his fundamental explanation for the limits of human knowledge.”²⁴ Jan Wojcik and John Henry also comment on the link between Boyle’s views about the limits of reason and his theological voluntarism.²⁵ The theological voluntarist emphasizes on the exercise of divine power in the creation of the world counters the rationalist’s insistence on creation according to (the dictates of) reason, which from the perspective of the former threatens to limit, or impose constraints on, divine omnipotence. According to the voluntarism-and-science thesis, a view about the dependency of the world on God’s will, coupled with nominalism and empiricism as the appropriate epistemological and methodological positions, is consequent upon this emphasis on divine power. Another consequence would be a view about the limited nature of human reason. Whether this cluster of themes obeys an internal logical coherence, or was circumstantially brought together for polemical purposes in various debates, has been the subject of an interesting recent exchange between John Henry and Peter Harrison, following the latter’s expression of doubts as to the validity of the voluntarism-and-science thesis.²⁶ The various aspects of this thesis are indeed complex and, I suppose, in need of further clarification. What interests my argument here is that the contexts of the theme of disproportion (and implicitly of the limits of human reason) are not confined to an invocation of divine power. On the contrary, where the idea of the

exquisite “cosmic mechanism” is prominent, it is God’s wisdom (often seen as accompanying his power) that serves as the term of comparison for the human cognitive capacities. Thus, for instance, in the context of explaining his notion of nature as a great “oeconomy,” Boyle talks of God’s complete freedom in creating the world while at the same time underlining the supreme rationality (wisdom) of the act: “I suppose no other Efficient of the Universe, but *God* himself, whose Almighty Power, still accompanied with his Infinite Wisdom, did at first Frame the Corporeal World, according to the Divine *Idea’s*, which he had, as well *most freely*, as *most wisely*, determin’d to conform them to.”²⁷ Both the creation and the preservation of the world are the outcome of a collaboration of power (or freedom) and wisdom. God is indeed the only true “efficient” in the world, since it is through his concurrence that the laws of nature and the oeconomy of the universe are preserved.²⁸ On the other hand, the lawlike order of the great system of the world *is* in fact in keeping with (the dictates of) reason, which is to say, of *divine*, rather than human, reason: God, Boyle warns in his *Usefulness*, cannot be supposed to have created the world proportionate to our understanding, but rather “according to the Dictates of his own immense Wisdom.”²⁹

The theme of disproportion does not seem to depend on an emphasis on the divine will. It is rather when measured up against divine wisdom (as expressed in the exquisite “contrivances” of the world—which indeed also testify to God’s power of creation) that man’s capacities of cognitive penetration appear puny. The discussion serves to emphasize (for Boyle as for Locke, and in fact more radically for the latter) the inscrutability, to the eye of man, of a large part of that wisdom. But it is also a token of divine wisdom and goodness, they argue, that there is also some measure of proportion or match between world and mind. In the *Excellency of Theology*, Boyle says that the obligation to study the truths of God is founded upon the two divine creative acts, “having as well made the World, as given Man the Faculties whereby he is *enabled* to contemplate it” (emphasis mine).³⁰ In the *Usefulness*, quoting Seneca, Boyle declares himself nature’s “Admirer and Adorer” and is confident that “Nature hath *designed* me to act, and imploy my self in Contemplation” (emphasis mine).³¹ Similarly, in the *Christian Virtuoso*, he reaffirms the divinely designed match between mind and world, with reference to the obligation to discover God’s attributes in creation: “God has given him a Rational Mind, and *endow’d* it with an Intellect, whereby he *can* Contemplate the Works of Nature, and by them acquire a Conviction of the Existence, and divers Attributes, of their supremely perfect Author” (emphases mine).³² In the *Christian Virtuoso*, part 2, the duty to love God equally rests on the

(partial) match between the way world and man are made: The world is a grand system infused with harmony and beauty, as expressive of divine wisdom, power, beneficence, and sovereignty. In themselves, Boyle adds, these are “attractive excellencies.” In his turn, man is endowed not only with “natural propensions” toward loving God, but also with reason, a fit instrument for “discern[ing] enough of the divine perfections.”³³ The human faculties are so framed as to be able to discern at least some of the wisdom expressed in creation: this is what grounds man’s *duty* to engage in the study of it. Moreover, Boyle writes in his *Disquisition about Final Causes* (1688), it is probable that one of God’s purposes in creation has been precisely to display such fecund wisdom so that it can be contemplated and admired by man: it is “very Likely, that God Design’d, by the great Variety of His Works, to Display to their Intelligent Considerers, the Faecundity (if I may so speak) of His Wisdom.”³⁴

Locke expresses similar views in his treatment of the discovery of the law of nature by man in his *Essays of the Law of Nature* (written in the early 1660s). The discovery of a lawmaker, of his will and of his wisdom, is the result of a conjoined inspection of world and of man. Both the excellencies of the created world and man’s obvious endowment for knowledge and action argue toward the existence of a will on the part of the creator, expressed in the ends of both world and man. The content of the will, which is also the content of the law, is spelled out, at least at a general level, by the very makeup of world and man. As creation of a “most perfect and wise maker” bearing the mark of a “gracious divine purpose,” all things seem to point to their being “intended by Him to no other end than His own glory.” Equally, the ends divinely intended for man may be grasped by inspection of man’s constitution and faculties, with which he was endowed by the Creator: man finds in himself the faculties of sense experience and reason, the only faculties, Locke says, that can “teach and educate the minds of men” and thus govern the labor of knowledge, so that “things otherwise wholly unknown and hidden in darkness should be able to come before the mind and be known and as it were looked into.”³⁵ The human faculties are for Locke, as for Boyle, educational tools allotted to man as a “stranger” to the divine truths of the world, and it is on realizing their function that he comes to “feel himself *disposed* and *ready* to contemplate God’s works and that wisdom and power of His which they display, and thereupon to assign and render praise, honour, and glory most worthy of so great and so beneficent a creator” (emphases mine)—which is the highest end, and so duty, of man, by the side of his duties to other human beings and to himself.³⁶

In a journal fragment of 1677 Locke summarizes these ideas. The mind

is not “suited to the whole extent of things”; but there is a fit between the constitution of our nature and the purposes for which we have been created (“to be happy in this world . . . and in the other world”).³⁷ All the knowledge we need is composed of “the history and observation of the effect and operation of natural bodies within our power, and of our duty in the management of our own actions, as far as they depend on our will, i.e. as far as they are in our power,” that is, of “experimental natural philosophy” and “morality and religion.” It is a sign of God’s “greatness” that the world exceeds our penetration, which is apt to “fill us with admiration of his power and wisdom.” But it is also a sign of his “goodness” that the things of nature are suited to our use and that by contemplating them we can “praise his bounty.”³⁸ The *Essay* is equally suffused with references to the fitness of man’s faculties for the purposes intended for him by the Creator: the “Portion and Degree of Knowledge” allotted to us are enough to ensure the conveniences of this life and the preparation for the life to come.³⁹ The fitness of the faculties for these purposes is in fact one argument against the existence of innate ideas (the faculties’ capacity for learning makes the latter unnecessary).⁴⁰ There is thus, for both Boyle and Locke, not only disproportion but also a divinely designed match between the human mind and the world.

The twofold understanding of the relation between mind and world in terms of both a match and a disproportion is at the basis of these philosophers’ conception of the rightful inquiry into nature and generally into all of God’s “contrivances.” The balance it seeks to strike may be better grasped if compared with the positions on the topic expressed in Pascal’s quarrel with the Jesuits. The Jesuit notion of an unproblematic fitness between human cognitive abilities and nature, resulting in both certain knowledge of nature and ascent of the mind in its meditation upon it, attracted Pascal’s ire. From his point of view, such a position rested on an anthropological fallacy and resulted in anthropological hubris: to fail to recognize man’s postlapsarian disproportion is to commit (once again) the sin of pride. The right attitude in front of this human situation is humility, and the contemplation of nature is valuable not in that it makes man godlike but in that it leads him to recognize his impotency. It should thus be part of man’s effort of realizing that he is an incomprehensible “monster” that only the Gospel can render intelligible and heal.⁴¹

The view held by Boyle and Locke is consistent with the Augustinian-Socratic anthropology I described in chapter 2. If Jesuit-scholastic “proportioning” is untenable, neither is radical disproportion a just representation of human nature. The recognition of disproportion (as well as of the distempers of the human mind) is critical to the self-knowledge

that makes possible not only due humility but also the husbandry of the soul and the legitimate advancement of knowledge. Boyle represents the latter in terms of the attitude of the rightful inquirer, who understands aright the balance of proportion and disproportion in his relation to the created world. In the *Christian Virtuoso*, part 2, he tells us that the inquirer who has begun to cultivate the attention, flexibility, and docility requisite for a “well-disposed mind” in natural investigations is apt to penetrate the “more intimate nature, or constitution of particular things,” and thus to grasp “the exquisite structures and contrivances” (the relations of influence, dependence, coordination, subordination, mutual subservience, harmony, and symmetry obtaining between the parts) of the “cosmical system.”⁴² But that grasp is readily recognized by the same kind of inquirer as only partial: it is due to his understanding of the relational nature of things, and thus of the dependence of any part on the (only partially unfolded) harmony and “cosmicity” of the whole, that he also acknowledges that there are still regions he has not yet, and some that perhaps he never will, penetrate. The growth of knowledge is, therefore, at the same time a growth of an understanding of the limits of knowledge. It is also a growth of “wonder,” as well as the stimulus for praise. With a phrase that recalls the Cusanian vocabulary, Boyle refers to this scenario of knowledge as “learned ignorance”: in contrast to “simple ignorance,” due to neglect of study, and breeding the “admiration of the ignorant,” learned ignorance is the fruit of a growth of knowledge that alone may measure up the territory of the incomprehensible and as such grounds the “admiration of the learned.”⁴³

The full and simultaneous view of “the whole aggregate” of created things, “both singly and in their connection, dependency, and (in a word) their entire system,” Boyle says in the *Appendix* to the *Christian Virtuoso*, is reserved to divine omniscience alone.⁴⁴ Man can only discover chains of the system piece by piece, as if he unrolled a “well contriv’d Romance” or a “fine and large piece of tapestry.”⁴⁵ Equally, the “infinitely perfect nature of God” is, from God’s own perspective, comprised in a single idea, with the attributes seen as one rather than itemized. From our limited perspective, though, the divine attributes, just like the parts of nature, can be seen only one by one (“contemplating him sometimes as omnipotent, and sometimes as wise, and sometimes as just, &c.”).⁴⁶ Boyle seems to suggest a parallel between the (fecund) system of the world and the (in reality simple) “system” of the divine attributes. Both transcend the human capacities of comprehension, but at the same time both have a double function: to signal human limitations (to those apt to acknowledge them) and to urge further search (again, to those

capable of pursuing it). The effect of the understanding of disproportion is thus the continuation of the search whereby the divine systems of the created world and of the Creator's attributes may be progressively (although never completely) understood and admired. At times, Boyle seems to think that man has been endowed not only with the cognitive powers requisite for the task but also with a specific form of desire, one that prompts the inquirer never to cease his search: the desire that in *Usefulness* he calls, quoting Seneca's *Natural Questions*, "a desire of knowing the rest."⁴⁷ The disproportion is thus, in fact, part of the match.

Locke's picture of the appropriateness of disproportion places much more emphasis on the consequences of the limits of the human intellect, although he, too, advances the idea of a "learned ignorance" that comes with the effort of understanding. On the one hand, understanding the balance of proportion and disproportion in the relation between the human mind and the created world is as crucial to his view of the right conduct of the intellect in natural inquiry as it was for Boyle's. His discussion of the great system of the world in which parts "owe [their] Being" to their neighbors leads him to the same conclusion that Boyle expanded on: the realization of the systemic nature of the universe and of the interdependence of its parts—which does not come naturally, but requires patient and attentive observation—prompts the continuation of the investigation along the chains of the great system: "and we must not confine our thoughts within the surface of any body, but look a great deal farther, to comprehend perfectly those Qualities that are in it."⁴⁸ On the other hand, Locke's emphasis here, as everywhere in the *Essay*, is on the very need of recognizing aright the wisdom of the disproportion. At some point in his discussion of our ideas of substances in book II of the *Essay*, Locke invites his readers to imagine what it would be like to have exalted faculties of perception: with enhanced hearing, we would live in a perpetual noise that would make it impossible for us to meditate and even to think. Similarly, with enhanced seeing (or "microscopic eyes"), we would perhaps come to discover the "Texture and Motion of the minute Parts of corporeal things," and thus their "internal Constitutions" and "secret Composition" (that is, possibly, the things that would make natural philosophy a certain science), but we would also become unable to endure the bright sunshine, and even perhaps the light of day. We would have magnified vision of parts but at the expense of wholes, and, owing to the radical incongruity to other human beings such vision would entail, we would no longer be able to communicate with other people. We would live "in a quite different World."⁴⁹ The monstrous picture of what a modified human being would be like if equipped for

scientia is meant to underline, by contrast, the ordained appropriateness of the human station; the relation between man and world is one of the wise proportions of the divine harmony: "He [God] hath fitted us for the Neighbourhood of the Bodies, that surround us, and we have to do with."⁵⁰ Our faculties are well enough framed for us to manage our life, and to recognize and admire our Creator. As for the degree of knowledge we are designed to have of the natural world, Locke sounds a powerful cautionary note: some advances in penetrating the nature of bodies are possible, yet only within the epistemic domain of the probable; we are on a surer footing in "*improving our Knowledge in Substances only by Experience and History*." Beyond that, it is very likely that "natural Philosophy is not capable of being made a Science."⁵¹

In what follows I would like to develop the argument that Boyle's and Locke's methodological prescriptions for the experimental study of nature, as well as their physico-theology, are informed by this foundational conception of the appropriateness of disproportion between the human mind and the created world. Crucial to this view, I have already intimated, is a concern with the good management of the intellectual and affective capacities of man: the relation between mind and world is not static but involves a process of growth.

Experience, history, and speculation

The justification of an always resumed experimental search in terms of the appropriateness of disproportion is frequent in Boyle's texts. It is through "particular Enquiries" into the qualities of bodies that a "knowing Naturalist," as opposed to a "superficial Observer," becomes able to "discern their secret Correspondencies and Alliances."⁵² On the other hand, due to the supreme fecundity of divine wisdom expressed in the construction of the universe, Boyle concludes on the mind's necessarily imperfect grasp of it at any moment of the investigation. The laws of nature are "so various and so numberlesse" and the creatures are so "pregnant" that a full account of the "Properties and Uses" of natural things cannot be expected to be arrived at in a single lifetime.⁵³ The magnitude of the task is no cause for despair, though, but rather points to the need of continued inquiry. Since "there is such a Relation betwixt Natural Bodies," any new experimental finding should be taken to indicate directions for further search rather than to establish a truth: the inquirer "must not presently think, that he has discover'd a new Truth, or detected an old Error." The role of experiments is to "suggest new doubts" and to "present

new Phaenomena," and thus to spur a continued search into the universal system of relations.⁵⁴

The requirement of a continued search into particular phenomena governs Boyle's views on the interplay of theory and experimental and natural history in the legitimate study of nature, as well as on the probable status of findings. The same holds for Locke, although he was more distrustful of theorizing in natural inquiry than Boyle. Nevertheless, I want to show that their views converge on the question of the pernicious effects of "speculation," in a manner that is congruent with Bacon's and the virtuosi's approach to the topic, and thus that their methodologies are partly to be seen as forms of a discipline for the mind.

Recent scholarship has illuminated the strong Baconian inheritance self-consciously assumed by the two philosophers, albeit with variations. In the "Proemial Essay" prefacing his *Certain Physiological Essays* (1661), for instance, Boyle announces that his project was designed "in order to a Continuation of the Lord Verulam's *Sylva Sylvarum*, or Natural History."⁵⁵ The need for a better constructed experimental history of qualities is also stated in the preface to the *Origin of Forms and Qualities*, and supported by an invocation of "our Illustrious Verulam."⁵⁶ Locke, too, as Peter Anstey has documented, was familiar with Bacon's *Sylva* in the early 1660s, at a time when he also became associated with Boyle's programs for exploring the histories of the air and of the human blood, in which he was active until after the end of Boyle's life, when he edited the latter's *General History of the Air* (1692).⁵⁷ In the "Advertisement" to that work, Locke reemphasized the Baconian nature of Boyle's program.⁵⁸

The extent to which Boyle's experimental methodology incorporated Baconian principles was signaled by Rose-Mary Sargent in the mid-1980s and has been more recently explored in comprehensive detail in the work of Peter Anstey and Michael Hunter. The latter have highlighted the importance in this sense of Boyle's letter to Henry Oldenburg of 13 June 1666, in which he presents an "account of my Designe about Natural History."⁵⁹ The crucial role natural history has for Boyle is also made clear in his prime speculative work, the *Origin of Forms and Qualities*. The work is aimed, Boyle says, partly at "exciting" his "Learned Friends" to find better explanations for natural phenomena and partly at prompting them to take up the task of collecting histories of qualities, which would be capable of grounding better theories.⁶⁰ The collaborative, ongoing nature of the process of compiling natural histories is repeatedly asserted and enacted by Boyle not only in his experimental activity but also in his literary techniques: a good example of the latter is the unmethodized format of the published *History of Human Blood* (1684) and his im-

mediately resumed work toward a second edition, which Harriet Knight and Michael Hunter have commented upon.⁶¹ Boyle made the point several times in his writings that he regarded the writing method of “loose tracts” or of “essays” more appropriate for the end of the stimulation of inquiry than the “systematical” manner, thus echoing Bacon’s and the virtuosi’s critique of the barrenness of beautifully methodical and closed systems.⁶² The “testimonies” of nature to be collected in natural and experimental histories are distributed between what Bacon described as nature in its ordinary course, and nature “vexed” by art, or “Cited to make her Depositions by the Industry of Man.”⁶³ The requirement of considering nature “vexed” by art in the compilation of the history, and the organization of what Bacon called “articles of inquiry” in the manner of “heads” or “titles,” are principles which Boyle took over from Bacon or the Baconian program of the Royal Society, while also adapting and elaborating on them.⁶⁴

Moreover, as Anstey and Hunter comment, it is within the context of designing guidelines for constructing natural histories that Boyle reflects on the reciprocal relation between constructing natural experimental histories and formulating theories and hypotheses. The natural history, Boyle writes in his “Design,” should neither ignore existing “hypotheses” (explanatory doctrines) nor be “confin’d to any.” It will in fact be able to “amplify & correct” existing theories, while at the same time using theories with a view to producing better framed experiments and to better understanding previous errors. The overall aim is not to test and verify theories but rather to “produce new *Phaenomena*” and to use theories in order to “make the History *both* more exact and compleat in it self, and more ready for use, and more acceptable to those that love to discourse upon *Hypotheses*.”⁶⁵ Against the hypothetico-deductive interpretation of Boyle’s method, Anstey and Hunter conclude that what he envisages is a “two-way reciprocal enterprise in which theory informs experiment with a view to constructing a natural history, which in turn informs theory.”⁶⁶ Sargent argued for a similar interpretation, stressing the correct way in which to understand Boyle’s warning about the “probable” nature of theoretical conclusions: “the conjectural nature of the inferences resulted from the absence of complete natural histories, not from the in-principle conjectural nature of science.”⁶⁷

Boyle did have a positive view of hypotheses, and he reflected on what a “good hypothesis” should consist in: it would have to be intelligible and free from any impossible, false, or absurd propositions, and it would have to be self-coherent and consistent with the phenomena it purports to explain, as well as with all the other known phenomena. In order to be

"excellent," it would have in addition to be the simplest and the only one that best explicates the phenomena, and it would have to have predictive power.⁶⁸ These were indeed the qualities that for him recommended his own corpuscularian hypothesis.⁶⁹ But explanations in terms of the ultimate "affections of matter" were neither possible nor desirable in every case under consideration, Boyle warned, so that second-order explanations in terms of "subordinate Causes" were called for.⁷⁰ In all these cases, in which reason took up the role of the rightful judge of experience,⁷¹ the construction of hypotheses was legitimate in that they could point the way to the discovery or production of "new phenomena." Reasoning and interpretation of experimental data were not only useful but inescapable and took the form of a "trial" on the model of the juror or of the "refiner" of metals. But such judgments, Boyle warned, can be only probable, or "morally certain" at best.⁷² Hypotheses must be built on a sufficient basis of natural history, and this is so difficult to obtain that extreme caution should be manifested in "erect[ing] such Theories as are capable to explicate all the Phaenomena of Nature." Thus, the strong requirement Boyle makes is that such "superstructures" be held "only as temporary ones": they are "not entirely to be acquiesced in, as absolutely perfect, or incapable of improving Alterations."⁷³ They have therefore the status of the "probationary" dictates of reason I discussed in chapter 4. This is a status, it should be noted, that hypotheses share with the "topics of inquiry" around which a natural history should be organized, as Boyle writes in his "Designe": these topics, especially in the first stage of inquiry, cannot be "compleat & consequently are not to be stable & fix'd <but> if I may call them Probationary and so to be alter'd &c. according as further Discoverys or more mature Consideration shall enable and invite to change & enlarge the particular Topicks."⁷⁴ There is thus a similar epistemological status Boyle reserves for (theoretical) hypotheses and (natural historical) topics of inquiry: both are probable and temporary. They also fulfill a similar methodological role in that they help direct and expand the investigation of particulars. In this way, Boyle echoes the Baconian notion of the tight relations among natural history, literate experience, and the collection and analysis of prerogative instances, coupled with the requirements that they be used to direct further inquiry, that results at every stage be assigned progressive degrees of certainty, and that they be held as only temporary.

Locke's view of the legitimate method of natural investigations is also firmly entrenched in an appreciation of the value of natural history. The difference from Boyle's conception lies in his much more skeptical position relative to the use of hypotheses. Building on John Yolton's insight

in his 1970 study on Locke, Peter Anstey has augmented the case for a Lockean natural historical method, against the hypothetico-deductive interpretation that was dominant from the 1960s to the 1980s, in Locke's as in Boyle's case.⁷⁵ The general stance here, premised on Locke's denial of epistemic access to the real essences of bodies, is summarized by Yolton thus: "far from Locke's denial of any knowledge of real essence leading to conjectures about real essence, that denial leads him to locate the science of nature with observation and experience."⁷⁶ A number of powerful arguments support the Yolton-Anstey thesis. First, among the types of agreement of ideas that Locke says knowledge consists in, the only one pertaining to substances is that of "co-existence," where "co-existence" is to be contrasted with "necessary connection": the coexistence of qualities can be known with certainty, although this is not the general knowledge that insight into the necessary connections of qualities would afford. Thus, Locke allows for a sensitive and experimental type of knowledge (a particular, not a general type), based on collections of qualities observed to coexist.⁷⁷ Second, hypotheses, as a species of probable thinking, are thus emphatically *not* conducive to knowledge for Locke, but are *only* probable. They are generally dismissed as nonscientific, in the strong sense of the word "science." Rather, hypothesizing is generally speaking a potentially dangerous activity, since it easily leads to the embracing of an unwarranted "principle"—a form of "dogmatism."⁷⁸ Third, when Locke does speak favorably of hypotheses, he does so only briefly, as a sort of concession. But what he has to say about the legitimate use of hypotheses still does not amount to any hypothetico-deductive method in any recognizable sense, since their role is to advance and guide *experience* itself, or the collection of histories, by helping the inquirer to discover and range new phenomena. Rather than being "foundations of reasoning" relative to which the observed phenomena would play an evidentiary role, "hypotheses and analogical reasoning find their domain of application in the compilation of natural histories."⁷⁹

Indeed, Locke warns in several places that we should "*adapt our methods of Enquiry to the nature of the Ideas we examine*,"⁸⁰ and if we do that, as Reason itself advises, we will recognize that while, for instance, morality may be capable of demonstration, in the case of "substantial Beings," "*Experience here must teach me*, what Reason cannot." Experience is the adequate method in the case of the "co-existence" of ideas: we may know, for instance, by repeated experiments, whether any additional quality may be added to our complex idea of a thing, e.g., whether malleability should be included in our complex idea of gold, by the side of its being yellow, heavy, and fusible.⁸¹ It is only such particular knowledge that

may form the domain of experimental natural philosophy, which should be approached by “this way of getting, and *improving our Knowledge in Substances only by Experience* and History.” Locke adds, significantly for the anthropological rooting of his methodological views, that this “is all that the weakness of our Faculties in this State of *Mediocrity*, which we are in this World, can attain to.”⁸²

One example of Locke’s critical use of “hypothesis” is in his discussion of cohesion. We do perceive the extension of bodies, which is “nothing but the cohesion of solid parts,” yet the various hypotheses advanced for explaining the causes of cohesion (e.g., the pressure of the air, or of a subtler matter such as the ether, holding the sensible parts of bodies together) are to be recognized as impotent (they would not explain how it is that the particles of air or of ether themselves hold together). Although ingenious, such hypotheses ultimately “leave us in the dark,” and the essential nature of cohesion, just like the nature of thinking, remains incomprehensible to us.⁸³ To expect full clarification here is as transgressive as to do so in relation to the question whether consciousness is the “affection” of one individual immaterial substance or not. Locke decides to “let Men according to their divers Hypotheses resolve of that as they please,”⁸⁴ since the experience of consciousness, which anyone can testify to, is enough for resolving questions of personal identity, just as the experience of cohesion is enough for studying the behavior of bodies, without our having to decide on a particular explanation of the nature of either matter or spirit.

Another example is Locke’s criticism of “maxims.” Consider, Locke proposes, the several ideas of body held by different philosophers: whichever idea one may fix on (be it “extension” alone, or “extension and solidity”), demonstrations as to the nonexistence or existence of vacuum will easily follow in both cases, with no possibility of refuting one by the other.⁸⁵ This way of approaching bodies by verbal proposition, Locke concludes, is totally futile, and “they cannot discover or prove to us the least Knowledge of the Nature of Substances, as they are found and exist without us, any farther than grounded on Experience.”⁸⁶ Even more pernicious is the unexamined taking up of principles on which to found a whole philosophy, not just of nature, but of morality, too: from a blindly embraced principle like “all is Matter” there derive both bad philosophy and a vicious conduct of our lives.⁸⁷ Locke concludes: neither “*general Maxims*,” nor “*precarious Principles*,” nor “*Hypotheses laid down at Pleasure*” can serve the inquiries of a truly rational creature.⁸⁸

Even though Locke downplayed theorizing in natural historical in-

quiry, while Boyle recognized its advantages, the two philosophers were in accord on the question of the harmful effects of system building, or “speculation,” both for the legitimate method and for the good conduct of the mind in natural inquiry. (As a matter of fact, it is in this sense that Locke most often uses the term “hypothesis.”) This is again a Baconian theme, present both in Bacon’s and in the virtuosi’s writings, but that may also be fruitfully seen, I have suggested, in the context of the *cultura animi* type of defense of “useful” against “speculative” knowledge. The latter is criticized as “barren,” not only in the sense of not being conducive to “works,” but also in terms of its unfruitfulness relative to the right conduct of the mind in inquiry. The Baconian analysis of speculation in terms of the operations of the distempered mind, involving irregular assent, the narrowing effect of the tincture of beloved opinions, and the self-adoring stance, had as a counterpart the framing of experimental inquiry as an exercise apt to govern the “agitation of wit” responsible for the speculative inclination, and to cultivate the “universality” and the humility capable of mastering and orienting the mind of the inquirer. I have shown that this theme is taken up and elaborated by the virtuosi in their methodological and apologetic writings. Here I would like to claim that Boyle and Locke echo the same vision, and thus that their defense of experimental against speculative philosophy is similarly founded on their conception of the distempers and regimens of the mind that I explored in chapters 4 and 5. The natural-historical interpretation of their methodology, as well as the theme of the Baconianism of later seventeenth-century experimental philosophy, will be enriched, I hope, by recognizing the theme of the education of the inquirer.

Two main themes are relevant here. First, speculation is associated with one frequently rehearsed item in the lists of weaknesses and defects of the mind that both Boyle and Locke shared with the anatomies of the mind I have investigated: the “forwardness” or “haste” of the mind in inquiry. Boyle warns that the inquirers should avoid formulating too general theories on the basis of too scant a collection of, or of too poorly examined, phenomena. They are thus “to set themselves diligently and industriously to make Experiments and collect Observations, without being over-forward to establish Principles and Axioms.”⁸⁹ The very construction of philosophical systems is due to “mens forwardness to write entire bodies of Philosophy.”⁹⁰ Here “our great Verulam” showed the way in his effort “to restore the more modest and useful way practis’d by the Antients, of Inquiring into particular Bodies, without hastening to make Systems.”⁹¹ Moreover, debilitating “haste” should be avoided not only in

the inquiry into the “relations” of the cosmic mechanism but also into the “ends” or final causes it exhibits. The ends form an equally complex structure as the relations do (e.g., “animal ends” are integrated with the “cosmic ends”): we should thus not be “Over-hasty in concluding” that this is an end or that a divine motive.⁹²

Similarly, for Locke, general hypotheses are often the result of the same flawed movement of the mind, as inventoried in the *Conduct*: the hastiness or precipitation of the mind, which “must have some Foundation to rest it self upon” and thus unwarily embraces any “hypothesis” that it finds ready to fulfill that function.⁹³ In the *Essay*, he also writes, in the context of discussing the use of hypotheses at IV.xii.13: “the Mind, that would always penetrate into the Causes of Things, and have Principles to rest on,” is prone to use hastily formed hypotheses as such bedrocks of reasoning.⁹⁴ The notion of an irregular mental movement at play in the framing of speculative hypotheses was firmly present in Locke’s thinking early on, as can be seen in his *De Arte Medica* (1669): “[Man’s understanding is] very restlesse and unquiet till . . . it has framed to its self some hypothesis and laid a foundation whereon to establish all its reasonings . . . and puting all these phansies together fashioned to themselves systems and hypotheses.” This text was written during Locke’s collaboration with Thomas Sydenham, himself a close acquaintance and admirer of Boyle’s. The preface to Sydenham’s major work, *Observationes Medicae* (1676), includes methodological prescriptions that, as G. G. Meynell has shown, are direct echoes of Locke’s conception of method. Thus, for instance, the practice is decried of those medical writers “whose minds have taken a false colour” (become tintured) under the influence of a “philosophical hypothesis.”⁹⁵ To keep speculative hypothesizing at bay is therefore, for Locke, not only a methodological prescription, but also a therapeutic requirement. The building of natural histories—of the air, of the human blood, of diseases or of botanical specimens⁹⁶—acquires thus not only the function of a legitimate method but also the value of an exercise for regulating the intemperance of the mind.

Second, speculation is associated with the construction of “systems” that purport to establish definitive interpretations of nature. It is thus, for Boyle, a direct consequence of the lack of recognition of the disproportion between the human mind and the fecund richness of the created world and speaks of man’s reliance on his “abstracted reason.” To devise a system is to block the growth of knowledge, and in view of his association of that growth with an effort of self-mastery, it is also to allow free rein to the “prepossessions” and “corrupt affections” of the mind. In Baconian

parlance, it is to fail the perspective of the universe and to fall into pride. What the “speculative Devisers of new Hypotheses” aim is to solve, rather than “increase or apply,” the phenomena; it is thus “no wonder that they have been more ingenious than fruitful.”⁹⁷ The prepossession of the mind, together with an ill-managed assent (the “want of freedom and attention in our speculations”), combine with the “want of a competent history of nature” in the establishment of errors.⁹⁸ In contrast, building experimental histories of nature, directed by carefully devised hypotheses and topics of inquiry, and guided by “docility,” represents a proportionate acknowledgment of the disproportion between mind and world. The probabilism attached to the theoretical moments of natural investigations is best seen as a feature of the “probationary” nature of both hypotheses and topics of inquiry: it presupposes a statement of the type “not yet” (you have not grasped the whole truth yet), which also involves a moral injunction of the type “do not presume that you have reached the end” (thinking so is to remain prisoner to your private view).⁹⁹ In this sense, the discipline of judgment implied in Boyle’s notion of “docility” is a means of always recognizing that the search is not over.

Locke’s strictures on hypotheses in natural inquiry are also primarily strictures on the building of speculative systems. He criticizes the solidification, so to speak, of a hypothesis into a system that acquires by accretion of both time and trust the prestige of uncontested and dogmatic truth. As such it breeds credulity and “implicit faith,” which are exemplars of the types of mind distortion he charted in his *Essay* and *Conduct*. Fidelity to one such system becomes thus above all fidelity to a set of terms and to a philosophical sect: “to this Abuse, those Men are most subject, who confine their Thoughts to any one System, and give themselves up into a firm belief of the Perfection of any received Hypothesis.”¹⁰⁰ The work of examination, whetted by a love of truth, which Locke recommended in his *Conduct*, would thus be the type of practice of the mind apt to keep it safe from the dangers of dogmatic system making or accepting. In his journal of 1677, Locke wrote that “speculations in Nature” are a mark of the failure to acknowledge the areas where knowledge is possible and useful and where it is not, or else the areas of proportion and the areas of disproportion between the human mind and the created world: men “need not perplex themselves about the original frame or constitution of the universe, drawing the great machine into systems of their own contrivance, and building hypotheses, obscure, perplexed, and of no other use but to raise dispute and continual wrangling” (emphasis mine).¹⁰¹ Equally, in his *Some Thoughts concerning Education*, Locke wrote that “the Works of

Nature are contrived by a Wisdom, and operate by ways too far surpassing our Faculties to discover, or Capacities to conceive, for us ever to be able to reduce them into a Science."¹⁰²

Speculation as Boyle and Locke understand it in these contexts would be the very attempt to "reduce" the wisdom manifested in creation, or the "fecundity" of God's works, to a human measure. Instead, the proportionate response of the true inquirer is to continue the search and to take care to recognize (dis)proportions. It is also, at the same time, to cultivate admiration and reverence for the Creator: the counterpart of the natural historical method is an exercise of natural religion.

Affective cognition

For Boyle, the experimental study of nature was one way of fulfilling the Christian's office of rendering praise to God. The striking image that encapsulated this idea for him was that of the naturalist as a "priest" of the "temple" of the world, celebrating divine service (the "sacrifice of praise") on behalf of the whole creation.¹⁰³ The understanding of natural historical inquiry as a natural theological activity is one facet of the complex early modern relationship between natural philosophy and theology, which shaped the distinct genre that was to be called "physico-theology."¹⁰⁴ In one sense, the project of physico-theology may be described as the framing of arguments based on the perceived tokens of divine workmanship in the natural world toward the demonstration of God's existence and providence manifested in creation.¹⁰⁵ According to Peter Harrison, physico-theology thus framed was gradually established as an "inductive science" in the eighteenth century. Devised as a "mixed science" at the crossroads of theology and natural philosophy, it rested on a specific type of explanation, of which Boyle provided the formal account,¹⁰⁶ and in which natural histories functioned as "a logical premise from which God's wisdom and providence could be inferred."¹⁰⁷ But this representation of physico-theology in terms of explanatory strategies serving a logical demonstration misses an important aspect of Boyle's view of physico-theological reasoning, which answers his framing of experimental investigations as a "sacrifice of praise." His talk of "arguments" in this context seems to point to the unfolding of an exercise for the mind rather than (simply) of a demonstration, where the study of the creatures functions more like an experiential premise, followed by advances in both understanding and emotional capacities, rather than by steps in a logical argument. The end point of such reasoning, for Boyle,

is not only the demonstration of the existence of God (against the “atheist”) but also the building of a religious virtuous disposition in the devout philosopher.

Thus, in his *Final Causes*, where the term “physico-theological reasoning” is employed, Boyle distinguishes between two types of reasoning from ends: physico-theological (which, from perceived uses of things, argues toward the existence of an Author and his general ends in creation) and physical (which, from those supposed ends, argues toward the nature of the corporeal things).¹⁰⁸ The former is most aptly applied to the “Universal Ends” of creation, which refer to “the Exercising and Displaying the Creators immense Power and admirable Wisdom, the Communication of his Goodness, and the Admiration and Thanks due to him from His Intelligent Creatures.”¹⁰⁹ Physico-theological reasoning is legitimate primarily in that it inspires devotion and piety. God’s existence, providence, and attributes are, in Boyle’s words, “manifested” by the physico-theological reasoning, where the “manifesting” is more effective than the mere “showing” performed by the Cartesian ontological proof.¹¹⁰ The Christian inquirer is not only to “observe” but to become “Affectively Convinc’d” of the wisdom of God.¹¹¹

Crucial to the theologically informed experimental inquiry into nature is not simply the demonstration of the existence of God (in the manner of the classic argument from design, say) but the offering of praise, and, as Boyle puts it, the “elevation of the mind” through contemplation of sublime objects, which can kindle a superior type of affections. This is not to say that the demonstration of the existence of God forms no part of Boyle’s understanding of the theological role of natural philosophy. That is indeed its first principle, as he says in the *Christian Virtuoso*. The crucial point is that he formulates that task in terms that ask not primarily for a logical demonstration but rather for a working up of belief in a manner that is both rational and affective.

In the *Christian Virtuoso*, part 2, Boyle calls this type of belief “philosophical faith” and characterizes it in terms of degrees of assent. Philosophical faith varies with the degree of firmness of the “assent that, upon the grounds furnished by nature, men have concerning the existence and chief attributes of God.” There may be “a very weak assent,” which, although guarding man from atheism, will not be enough to make him pious. On the contrary, “his piety, as well as his other virtues, will usually be proportionate to the firmness of the assent he gives to that fundamental article of religion, that there is a Divine Maker and Ruler of the world.”¹¹² Such firmness of assent can come only with the careful, deep-looking inquiry into the great fabric of the world that Boyle advocates

as the true experimental philosophical task, and with the contemplation of the samples of divine workmanship in the “relations” of the world, which will be as many arguments grounding one’s faith. The point is clear in the *Christian Virtuoso*, where the weak versus firm assent distinction is echoed by the “ordinary swimmer” versus “skilful diver” contrast between degrees of attention. “Perfunctory Considerers” look swiftly only at the surface of things and thus can form only (weak) “assent,” while the “Heedful and Intelligent Contemplator” discovers the illustrations of divine artifice in the “recesses” of nature by means of a detailed and discriminating investigation of particulars, allows them to sink in, and is thus capable of forming a (strong) “belief” in the existence of the Creator.¹¹³ The chief example of a weak assent-forming argument is that of the scholastics: their accounts of nature are dispensed with in a few words, and the examples they use are too general to be effective. As such, they do not urge man to search more into the “structures of things” and by themselves are insufficient to reveal the “exquisite Wisdom” that the Creator expressed in the makeup, motion, and functioning of natural bodies.¹¹⁴ In other words, they remain logical arguments, without managing to become experiential arguments. The latter depend precisely on the patient unraveling of the relations of particulars in the fabric of the world, which we have seen was the legitimate mode of inquiry premised on the appropriateness of disproportion.

But the strong belief in question is not the result of a uniquely cognitive process. Boyle rather talks of a way of affecting the mind so as to form a special sort of belief, a “conviction” that is both rational and affective. The experimentalist is not only able to say that God is wise but discovers more and more *how wise* he is; and with the discovery he is transformed in his understanding and in his emotions: “And ’tis not by a light Survey, but by a diligent and skilful Scrutiny, of the Works of God, that a Man must be, by a Rational and Affective Conviction, engag’d to acknowledge with the Prophet, that the Author of Nature is *Wonderful in Counsel, and Excellent in Working*” (cf. Isaiah 28:29).¹¹⁵ The hierarchy of observers as dependent on a hierarchy of degrees of attention is present here again, when Boyle distinguishes between a “general, confus’d, and lazy Idea” of God’s power and wisdom and the “distinct, rational, and affective notions of those Attributes which are form’d by an attentive inspection.”¹¹⁶ A mind that becomes prepared for praise is a mind that is being touched in its affections and thus intimately transformed. The language of love, desire, and wonder comes to be inextricably blended with the language of rationality. Boyle calls this cognitive-affectionate state (or rather active disposition) of the mind “rational Wonder.”¹¹⁷ Admiration, celebra-

tion, humility, gratitude, love, and trust are Boyle's examples of what he alternatively calls "the nobler acts of natural religion" or the "religious virtues," cultivated by the diligent student of nature.¹¹⁸

Furthermore, in his *Usefulness* Boyle calls the proper study of nature a "concern'd survey" that is propelled by "an inquisitive Industry to Range, Anatomize, and Ransack Nature" and is conducive to an "exquisite Admiration of the Omniscient Author."¹¹⁹ The meaning of "concern'd" is spelled out in his *Excellency*. There, in proceeding to show what the "contentments" are "accruing from the study of nature," Boyle develops a simile comparing the inquirer's attitude toward "the wonders of Nature" and thus toward God their "wise Author" to the attitude toward "such an one as he intirely honours and loves, and to whom he is related." The student of nature needs to see himself as a friend, child, or else "passionate Lover" of his object of inquiry: his quest will thus be "concern'd," and it is by means of such a concerned pursuit that our "inclination to self-love" may be countered and the mind may attain the dynamic quality of rational wonder.¹²⁰

The God that the experimentalist relates to (rather than demonstrates), on Boyle's view, is a creator and a parent, a preserver and benefactor, as well as a sovereign. To form such a (true) notion of God is the fruit of a long, diligent, docile exercise in the careful observation of the world. The superficial spectator (or the scholastic metaphysician) can go no further than an "undiscerning, weak, or unconcerned" notion, which is "in a word, a mere nominal deity." In contrast, an experimental relating to God may reveal him as the "powerful, wise, just, and active author, upholder, and sovereign governor of the world," which is, Boyle adds, also the true philosophical notion of him.¹²¹ The notion of an "active God" is in direct relation with Boyle's theological ontology of matter moving with the continual concourse of the divinity, as well as with the image of the world as rich and fecund. The "pregnant Automaton" may not be exactly breeding new offspring, but it is itself the fruit of an original fecundity expressive of both wisdom and power, and it is perpetually infused with divine activity. It is apparent from Boyle's continued reflections on the theme that the experimental search for the truths of nature is conceived as a renewed encounter with that activity, wisdom, and power.

If Locke cannot be expected to display the radiant eloquence that Boyle cultivated early in his writing career and traces of which are visible in his natural theological metaphors, his understanding of the study of nature as an act of devotion is nevertheless close to Boyle's. A similar conception of the special type of "conviction" about God bred in the student of nature—one that involves the mind's wonder, attention, and concern,

is expected to work up an inner transformation, and is set in opposition with the demonstrative types of proofs for the existence of God—can be identified in his early *Essays on the Law of Nature*, as well as in the natural theological passages of the *Essay*. It is significant in this sense that Locke became familiar with Boyle's *Usefulness* shortly after its publication, that is, during the period when he was writing the *Essays on the Law of Nature*, and that he read and commented on a first draft of the *Christian Virtuoso* in 1681, before the publication of his *Essay*.¹²²

In the *Essays on the Law of Nature* Locke elaborates on how sense experience and reason work together for the establishing of truths about natural law and God. But here, as in Boyle, at stake is not demonstration and logical inference but rather a process of growth in awareness and appropriate emotion. The steps Locke describes are at one level steps in an argument, but at the same time they are also experiential steps: what he does is in some sense narrate the story of what happens to a mind that sets itself the task of learning about God from nature. Thus, in a first step, the senses identify the existence of sensible bodies with their attendant qualities, "namely lightness and heaviness, warmth and coldness, colours and the rest of the qualities presented to the senses, which can all in some way be traced back to motion." By the same movement they discover "that this visible world is constructed with wonderful art and regularity," as is perceivable in the motion of the stars, the course of the earthly waters, or the succession of seasons. This perceptual grasp of the world by the senses is also reflected back on the perceiver: "and of this world we, the human race, are also a part."¹²³ The work of the mind as prompted by the senses is one of impressing upon the beholder the structure ("fabric") and the harmony ("beauty") of what he sees—a work of what Locke calls "careful consideration" and "contemplation": "the mind, after more carefully considering in itself the fabric of this world perceived by the senses and after contemplating the beauty of the objects to be observed, their order, array, and motion, thence proceeds to an inquiry into their origin, to find out what was the cause, and who the maker, of such an excellent work."¹²⁴

The "consideration" and "contemplation" required for the process of the discovery of God and his law in nature are members of the superior degrees of thinking listed in the *Essay*, on which I commented in chapter 5. I suggested there that "attention" and its cognates are for Locke complex modalities of thought that involve an affectively oriented cognition, guiding the mind and preserving it from the debilitating effects of laziness and precipitation. In the *Essays on the Law of Nature*,

Locke also points out the “great labour” needed if unobvious things or “those resources which lie hidden in darkness are to be brought to the light of day.” He is echoing here the truth-lies-deep notion, which was common currency among Protestant views of the pursuit of knowledge, where the difficulty of knowledge was accompanied by the idea of a need for labor and industry, as opposed to idleness. In the same vein, Locke writes: “they [the resources] do not present themselves to idle and listless people,” but indeed “careful reflection, thought, and attention by the mind is needed, in order that by argument and reasoning one may find a way from perceptible and obvious things into their hidden nature.”¹²⁵ The “attention by the mind” is therefore the requisite mode (and degree) of thought involved in the conjoined work of senses and reason in the discovery of God and his law.

Thus, the discovery of the existence and will of a Creator by inference from the senses is not the result of a casual glance at the things around; it requires a work of the intellect on experiential data, which Locke gradually came to think was a sort of passionate cognition. Nor is that discovery a matter of theoretical demonstration: Locke explicitly repudiates, as did Boyle, the metaphysical or logical proofs for the existence of God, as well as the accounts of the knowledge of the law of nature as based on innate notions, on conscience, and on tradition.¹²⁶ The argument offered by his alternative solution is not only, or not simply, an argument tout court. It does establish a truth and a duty, and requires a careful work of reason that it may succeed. But in doing so, it is also proposed as a form of *doing*, as a practice of the duty that one finds it establishes. In inferring the existence, power, and wisdom of a God from the works of nature, the mind is already, if attentive, engaged in that “praise, honour, and glory” that man’s duty, as he finds out, demands.

The practical, experiential dimension of this type of knowledge pursuit is repeatedly emphasized in the *Essay*, where Locke says that it is in fulfillment of our duty, which is at the same time a concern for our souls, that we should order our lives so that we can attain the happiness to be had in this world and prepare for the happiness that awaits the just in the other. The study of nature is emphatically placed in this very context, of the practice of our lives informed by our duty to our Creator. The *Essay* does of course also present an argument for the existence of God in the manner of a logical demonstration in book IV, chapter x. The argument there seeks to establish the preeminence of thought over matter and thus the fact that matter could not, in and by itself, have created thought. The *Essays on the Law of Nature*, in contrast, was not primarily concerned with

establishing that God is a thinking being. Its aim was to make clear the steps through which the mind could come to the recognition of a deity and of some of its ends in creation—which formed the foundation of the discovery and understanding of the law of nature, or the basis of our lawful conduct in this world. This strand of the account in the *Essays on the Law of Nature* does not inform the demonstration at *Essay IV.x* but is instead scattered through the parts of the *Essay* that discuss the extent of our knowledge of nature. Thus, for instance, in his discussion of the “Improvement of our Knowledge,” Locke exposes again the limits of our knowledge of bodies but adds: “I would *not therefore* be thought to disesteem, or *dissuade the Study of Nature*. I readily agree the Contemplation of his [God’s] Works gives us occasion to admire, revere, and glorify their Author.”¹²⁷ Likewise, inserted in his discussion of our ideas of substances, and in the vicinity of a reaffirmation of the limits of man’s faculties, is a fragment that recommends the study of natural things for the two main reasons that it helps with the “Exigencies of this life” and that “we have insight enough into their admirable Contrivances, and wonderful Effects, to admire, and magnify the Wisdom, Power, and Goodness of their Author.”¹²⁸ Locke emphasizes repeatedly that this kind of knowledge—which is accompanied by recognition, wonder, and praise—is the kind suited to our condition and ends.

The rightful business of the human mind, Locke and Boyle agree, is to scrutinize the particulars and their relations in the “system” of the world, which is the bedrock both of rightful natural philosophy and of natural religion. Knowledge of the qualities and powers of bodies is apt to improve the practical, beneficial sciences, such as medicine, botany, or chemistry. It may also, Boyle believed, although Locke was less confident, reveal more and more about the true nature of things and confirm (or disprove) the corpuscularian hypothesis. On the other hand, this type of pursuit of natural knowledge also makes possible the careful contemplation of the structures and ends of the cosmos, and of man’s place in it, which may spell out for him his duty and concern.

The experimental study of nature is also, for both authors, an exercise in understanding proportions, which is indeed an exercise in self-knowledge in the context of the divinely authored universe. There is a match between mind and world, but that match includes a crucial amount of disproportion. A right understanding of the dimensions of this disproportion is of the essence for man’s understanding of his place in creation and for the pursuit of useful knowledge (the knowledge that will improve his mind and life). It also enables the cultivation of the “religious virtues” of admiration and praise of the Creator. The affective cognition gener-

ated by what Boyle calls physico-theological reasoning, and Locke the inference to providence, is for these authors the outcome of a transformative exercise that works on the cognitive, moral, and affective powers of the inquirer. It is thus part and parcel of their conception of the education of the human mind, now approached from the perspective of the cultivation of its religious virtues.

Studying “God’s Contrivances”

The study of theology and the growth of the mind

The joint appeal to the “two books,” nature and Scripture, is a recurrent theme of early modern thought. The variety of ways in which the theme is used is paralleled by a variety of ways in which the relation between natural philosophy and theology is understood, going from thorough overlap, through formulas of cooperation, to complete separation.¹ While an explication of this range of solutions lies beyond the scope of this book, the relevance of the “two books” theme to the regimen of the mind topic is of direct interest to it. Relevance here does not rest on the issue of compatibility, that is, on questions about the possibility of transfer of information or of explanatory frameworks from one “book” to the other. Such concerns are indeed important to seventeenth-century natural philosophical thought, as when, for instance, Boyle attempts to understand the phenomenon of resurrection with the conceptual tools of mechanical philosophy.² More relevant for the purposes of this book is rather a conception of the work of studying or “reading,” which highlights the activity of *the reader* of the two books: the reader’s task, the aims of reading, and the processes through which the good reader is expected to go. Such an emphasis on types of readers and on reading as an exercise for the mind plays an important role in Boyle’s and

Locke's approach to the "two books" theme. This approach also involves an identification of points of intersection between natural philosophy, natural theology, and revealed theology within an integrative view about "God's contrivances," which trace the domain of study, and the domain of the regimen, for the Christian philosopher. The concern of this final chapter will be with the cultivating value Boyle and Locke attached to the study of theology and of "God's contrivances" (seen as interdisciplinary objects at the crossroads of philosophy and theology), as well as to their biblical hermeneutical directions.

In his *Excellency of Theology* Boyle devotes a section to the "advantages" of the study of theology, which he presents as so many motives for engaging in it. The advantages in question have to do one way or another with the "enlargement" and "elevation" of the human faculties. Three of them deserve special notice. In the first place, theology offers the noblest object of contemplation. As such, it is an adumbration of man's "blessedness in Heaven," since the happiness of man consists in the "exercise of his noblest Faculties on the noblest Objects," and the beatific vision will be precisely an act of (active) contemplation of the divine face, coupled with supreme "joyous Affections."³ In the second place, the study of theology conduces to an improvement of the contemplator's piety and virtue. Boyle makes the point that the foundation of that improvement is the disposition to admire, love, trust, and resign oneself to the will of the Creator, which is also the fruit, he believed, of well-conducted inquiry into nature. Moreover, that disposition is called a "bettering of the mind" that has to be recognized as both a moral and an intellectual improvement, contrary, Boyle says, to the common opinion that takes it as a uniquely moral matter.⁴ Finally, the highest advantage has to do with the promise of the "Everlasting fruition of Divine Objects" in the afterlife, when our knowledge and desires here will be fulfilled and transfigured, and the "Eye will be Enlighten'd."⁵

We have seen that for Boyle the experimental study of nature, in its relation to natural theology, was itself conducive to such improvements, both cognitive and affective: the virtues of docility and modesty made room for and combined with the religious virtues, to the "growth" of the human mind. The study of theology, understood as the study of the revealed word of God (by the side of the divine attributes, which are also expressed in his book of creatures), is said to further that work. The way theology acts upon the mind is of the same order, though in an intensified degree, as the way the book of nature does. It, too, enlarges the understanding and the affective capacities of man, and it, too, cultivates

moral and intellectual virtues. It is, therefore, not a completely different undertaking but truly furthers the same work the study of God's natural works performs.

Locke expresses similar sentiments when he writes in the *Conduct* about the "comprehensive" nature of theology in relation to other sciences. What makes theology a science "above all the rest" seems to be not only its superior subject matter but the function and use of all knowledge that comes with its study: theology is to be understood as "the Comprehension of all other Knowledge directed to its true end; i.e. the Honour and Veneration of the Creator, and the Happiness of Mankind."⁶ There are similar reflections in the *Essay*, where he writes that the "knowledge and veneration" of the Creator are "the chief end of all our Thoughts, and the proper business of all Understandings."⁷ Theology, then, is a matrix of all human knowledge owing to the fact that it establishes the true end of knowledge, as well as the direction of the proper conduct of the understanding. The praise and veneration of the Creator are indeed the encompassing *telos* of the pursuit of knowledge, of the good use of our minds, and of the care of our souls. In this respect, the study of theology reinforces and furthers for Locke, as for Boyle, the natural religious orientation of the study of nature. We have imperfect ideas of substances, and our faculties are not capable of penetrating the essences of natural things, yet, Locke writes in the *Essay*, we are sufficiently equipped to see, understand, and admire the divine workmanship and to conduct our minds and lives in a rightful way.⁸

The *Conduct* passage describing the study of theology is part of a section headed "universality," the counterpart of Locke's sections on "partiality" (of judgment and of studies), which is one of the instances of the weaknesses and mismanagements of the mind. It appears thus that Locke considers the study of theology to be one of the remedies for what he calls narrow, partial minds and a privileged route toward the formation of a truly comprehensive, or "universal," mind. Such a mind would also be one devoted to the pursuit of truth for the love of it. The *Conduct* passage continues: "This is that Science which would truly enlarge Men's Minds, were it study'd . . . every where with that Freedom, love of Truth and Charity which it teaches, and were it not made, contrary to its Nature, the occasion of Strife, Faction, Malignity, and narrow Impositions."⁹ Theology, then, is a science defined not only by its object but also by the orientation it imprints on all human thinking: it crowns the other sciences not only as a most sublime inquiry but also as a horizon implicit in each and every one of them. It can do that because it not only requires but actually teaches one freedom, love of truth, and charity.

Theology for Locke, as for Boyle, is a practical science. The purpose of its study is not to devise speculative definitions but to discover the true guide to a life lived in conformity with God's will. To follow revealed truth is, in a biblical phrase on which Locke dwelled in his *Paraphrase and Notes upon St. Paul's Epistles* (1705–7), to be "renewed in the spirit of your mind" (Ephesians 4:23). The Scriptures, Boyle wrote in *Some Considerations Touching the Style of the Holy Scriptures* (1661), not only form the best guide to life but are themselves operative on pious hearts.¹⁰

The notions of the operative nature of theological studies and of the comparable effect theological and natural studies have on the human mind throw some light on the two philosophers' attitude to the relation between reason and revelation. In Locke's case, the growing tendency in his thought in the 1690s seems to have been to place increasing weight on the limits of reason and the superiority of revelation. The key point here is that there are truths that natural reason cannot discover by itself (either because of its contingent weakness or because of its inherent limitations). But in itself this point does not entail any radical rupture between reason and revelation if what is at stake is not the source of truth but rather the way various types of truths contribute to the progress of the understanding. In this respect, Locke's belief that natural reason is not destroyed but actually enlarged by revelation remains constant from the *Essay* to the *Paraphrase*.

In the *Essay*, he writes that reason is "assisted and improved" by information culled from Scripture, that the "supernatural Light . . . does not extinguish that which is natural," and that "*Revelation* is natural Reason enlarged."¹¹ The context of these statements is the critique of enthusiasm (and its implicit claim that illumination annihilates reason). Locke resumed this topic in the *Paraphrase*, where he reflected on the relation between natural and supernatural light in more general terms, beyond the contextual religious polemic around enthusiasm. The injunction in Galatians 5:16, "Walk in the Spirit," is rendered by Locke as "conduct your selves by the light that is in your minds." In his notes, he explains that "spirit" may be understood as "the inward man" or the "law of the mind," which is to say, "that part of a man which is endowed with light from god to know and see what is righteous, just, and good."¹² The "light" here does not presuppose any rupture between natural light, the light afforded by the revealed word, and the supernatural light of grace; it rather bridges these three notions. Locke cross-references these passages to those on the "renewing of the mind" in Ephesians 4:23 and Romans 12:2. He paraphrases the latter ("but be ye transformed by the renewing of your mind, that ye may prove what is that good, and acceptable,

and perfect, will of God”) in such a way as to emphasize the work of reason informed by revelation: “But be ye transformd in the renewing of your mind that you may *upon examination* find out, what is the good, the acceptable and perfect will of god” (emphasis mine).¹³ The renewing of the mind, then, presupposes the natural reason’s work of examination applied to divine truths—here not in the sense of attesting them as coming from God (which was prominent in his attack on enthusiasm), but in the sense of making an effort to understand, of the same type he recommended in his *Conduct*. The assistance of God’s Spirit is indeed supremely operative in the renewing of the mind (cf. 2 Corinthians 4:16 or Ephesians 3:16), but Locke did not think that either revealed truth or grace annulled reason and its powers; on the contrary, he believed they worked toward its growth.

In this respect, Locke’s views are close to Boyle’s notion of “experience” in the enlarged sense—one that covered both natural and supernatural truths—and of its paideic effect on the growth of reason. In addition, Boyle also intimated that the supernatural aid of grace extends rather than extinguishes the work of the understanding. In his *Excellency of Theology*, he tells us what it is for reason to be not only “improv’d by Philosophy” but also “elevated by Revelations” in the study of the Scriptures: the holy writings will occasion “free Ratiocinations,” will open onto a discovery of hints, and will also offer “assistances of God’s Spirit, which he is still ready to vouchsafe to them that duly seek them.”¹⁴ Ratiocination, discovery of hints, and assistance from the Spirit (which continues and rewards the work of reasoning and openness to hints) are mutually enabling ways of “clearing the eyes” of the understanding.¹⁵

Thus understood, the topic of the relation between reason and revelation may also throw light on Boyle’s and Locke’s views on the relation between knowledge in this life and the next. In the essay “Of Study,” Locke wrote: “The knowledge we acquire in this world I am apt to think extends not beyond the limits of this life. The beatific vision of the other life needs not the help of this dim twilight.”¹⁶ But in the same place he also said:

It is a duty we owe to God as the fountain and author of all truth, who is truth itself, and ’tis a duty also we owe our own selves if we will deal candidly and sincerely with our own souls, to have our minds constantly disposed to entertain and receive truth wheresoever we meet with it.¹⁷

Whatever our epistemic acquisitions in this life, they are dust from the perspective of the other world. But at the same time, not only is the pur-

suit of truth not amiss here, in this life, but it is our duty to engage in it: if man neglects his reason, he "transgresses against his own Light" and fails in a duty he owes both himself and his Creator.¹⁸ The epistemic *content* acquired here, Locke suggests, has less value for our future fate than the *practice* of cultivating the mind's powers. In the *Christian Virtuoso*, part 2, Boyle also surmises that the pursuit of knowledge in this life will probably prove beneficial in the next despite the possibility that God may alter the very structure of things. The crux of this supposition is the reference to the enlargement of the capacities of the mind that the search for truth is able to perform, if undertaken as a task to use the gift of reason well. Such a rightly oriented effort might well be rewarded with both increased knowledge and improved faculties in the afterlife.¹⁹ For both these philosophers, the cure and training of one's soul are ultimately an endeavor placed in the horizon of the world to come.

Worlds and angels

Worlds, systems, and the realm of experience

As far as knowledge in this life is concerned, Boyle argued in a number of texts for a relation of "congruity" or "symmetry" between truths discovered by natural (philosophical) light and truths learned from revelation. In the sequels to the *Christian Virtuoso*, he compared the two types of knowledge to the two parts of a key, complementing each other in the study of "divine things," and spoke of the "graft" of theology upon "human learning."²⁰ In the *Excellency of Theology* he proposed that there is a "Great and Universal System of God's Contrivances" that is the one object of man's pursuit of truth, be it via the revealed or the natural books of God. The corpuscularian theory of matter and the theological doctrine of man's redemption, Boyle says, are equally parts (and only parts) of what would ideally amount to a "universal hypothesis" relative to the one system of divine "contrivances," expressive of the divine "Nature, Counsels, and Works" and discoverable by the "Light of Nature, improv'd by the Information of the Scriptures"—which is to say, by reason working with the full scope of "experience."²¹ Several fundamental matters illustrate, for Boyle, the symmetry of the two types of knowledge: the creation of the world (which underlies his natural philosophical ontology), the creation of man (which informs his account of the natural theological duty of the student of nature), and the redemption of man (which spells out for him the relation between creature and Creator that guides a Christian's life).²²

Another domain illustrative of the same symmetry is constituted by the types of “worlds” and “systems” that are expressive of the divine attributes of power and wisdom, as members of the divine “contrivances.” Here Boyle and Locke are again in accord.

In the *Appendix* to the first part of the *Christian Virtuoso* Boyle draws a distinction between a “creaturian theology,” which fails to take into account “immaterial substances and abstracted beings, especially God himself and his divine perfections,” and true natural theology, which includes them in its scope.²³ The need to take immaterial things into account in the contemplation of God’s works is an important strand of thought in the *Christian Virtuoso*, part 2. They include not only the rational soul but the various types of intelligences whose existence is indicated by the Bible. They are not only nobler objects than the corporeal but need to be approached by a different route than by mechanical philosophy. Take, for instance, Boyle proposes, the human mind: the “metaphorical [i.e., non-corporeal] motions” it displays must be of a much more impressive variety than the “modifications” of matter, which are uniquely due to local motion.²⁴ But we still know so little of it, and in general, the whole “pneumatical world, or system, if I may so call it” is so foreign to us that, if we begin to look at it, “we enter into a new world indeed, that much better deserves that title, than did *America*, when it was first discovered by *Columbus*.”²⁵

A true natural theology, then, makes use of the whole sphere of “experience.” Part of that experience is the “theological,” or “supernatural,” which includes Bible testimonies, as well as testimonies of direct communications from God or the spirits. Boyle’s picture of the world is such that it accommodates this enlarged notion of experience. He speculates in a number of places on the number of “worlds” (corporeal and spiritual) that we must take the created world to contain. In the *Christian Virtuoso*, part 2, he proposes “three worlds or grand communities”: the “spiritual” (angels, devils, separate human minds, e.g., “*the spirits of just men made perfect*”), the “corporeal” (visible bodies), and the “dioptrical” (corporeal creatures invisible to the naked eye, “telescopical and microscopical”).²⁶ In the *Excellency of Theology*, in illustrating the “general Theory of things” idea, he counted “four grand Communities of Creatures”: the corporeal, the “Race of Mankind” (intellectual beings “vitally associated” with organic bodies), the demons, and the good angels.²⁷

An even more extended reflection on the sense of “world” in its relation to the divine attributes can be found in Boyle’s *Of the High Veneration Man’s Intellect Owes to God* (1685). The text is intended as a rebuke

against those divines who "dogmatize" about God's "Nature and Perfections," which should be recognized for the "Abstruse Subjects" they are. There may be divine attributes we are ignorant of, such as might be displayed in the creation of other worlds.²⁸ On the other hand, we have an imperfect grasp of the attributes we do know of, most notably "power" and "wisdom." As far as the latter is concerned, for instance, there may well be other corporeal worlds, systems framed differently from ours, and thus displaying different phenomena, abiding by different laws of local motion, and so exhibiting different dimensions of divine wisdom.²⁹ But God's wisdom is even more glorious in framing the "worlds" of the invisible and immaterial creatures. First, both good and bad angels, by the side of the soul of man, are "intellectual beings" displaying innumerable "motions" of thought, will, and moral states that require a more exquisite wisdom than the corporeal mechanisms. Second, their respective worlds or communities are themselves complex structures that need to be wisely managed. In the third place, the spirits' ministrations to the functioning of the other created worlds ("the great Aggregate of all the Creatures of God") need themselves to be wisely administered.³⁰

Further, even if they are no longer a question of "worlds," the big events in sacred history are actually instances of well-contrived "structures" that are equal participants in the universal system by the side of the corporeal and incorporeal worlds. The Day of Judgment, for instance, will reveal the wise weaving of historical providence, where private ends are finally shown to serve the divine ends and accomplish "a Plot worthy of God" or "this whole amazing *Opera*, that has been acting upon the face of the Earth, from the beginning to the end of Time."³¹ The tending to the "millions of engines" of this "Opera" is such as to make the human task of managing the complicated structure of the famous Strasbourg Clock a risible affair. Another example is the very "Oeconomy of Man's Salvation," perhaps the supreme manifestation of God's "manifold wisdom": not only myriad points of sacred history and of the natures of man and Creator need to be reconciled in that event, but also all of God's attributes, some of them seemingly contradictory, such as "his inflexible Justice" and "his exuberant Mercy." This work of wisdom is most aptly compared to the divine solution to a divine problem, far exceeding in complexity the most difficult mathematical problems.³²

Boyle's conjectures upon the "worlds" and "systems" of the divine contrivances are one fruit of his extended notion of "experience" (physical and theological) and of the conception of the education of reason through experience thus understood. The realm of experience, for Boyle,

is the realm of philosophy and theology combined. Moreover, that realm not only defines an (interdisciplinary) object of study but also traces the territory of an inner discipline for the student. In comparing the “creaturian theology” with the true natural theology, he says they are distinguished not only by their objects but also by their aims: the former is concerned with systems of definitions, while the latter is founded on the obligation to love and obey God.³³ For Boyle the growth of reason is a growth in understanding and rational affections alike. The systems of divine contrivances are expressions of divine wisdom, in which an incomprehensible multitude and variety of things are brought together and made to combine in subtle relations and concatenations to work for the final fulfillment of a divine purpose. In their study, the human mind, if rightly disposed and capable of the virtue of “docility,” may respond with rational (if partial) understanding and rational wonder at once.

The existence of a spiritual world by the side of the material in the great frame of the created universe, speaking thus of the manifold wisdom of God, is also a recurrent conjecture in Locke’s thought, as is the related reflection on the disciplinary status of the study of these other worlds. Locke is thus engaged, as was Boyle, in tracing the disciplinary map serving the type of study worthy of a Christian philosopher.

By the side of the conception of the material world as a cosmic structure of relations, Locke also advances, as does Boyle, the idea that the universe is also a harmonious structure of both material and immaterial levels of being. Locke’s chain-of-being ontology, through which he represents to himself this structure, is presented as a most probable conjecture, introduced by “it is not impossible to conceive, nor repugnant to reason.”³⁴ The ground of this conjecture is the divine attributes of wisdom and power (whose discovery is the main act of natural religion, performed through the activity of the senses and of reason, as we learn from the *Essays on the Law of Nature*) and the consequent idea of the perfect harmony of the world:

And when we consider the infinite Power and Wisdom of the Maker, we have reason to think, that it is suitable to the magnificent Harmony of the Universe, and the great Design and infinite Goodness of the Architect, that the *Species* of Creatures should also, by gentle degrees, ascend upward from us toward his infinite Perfection, as we see they gradually descend from us downwards: Which if it be probable, we have reason then to be persuaded, that there are far more *Species* of Creatures above us, than there are beneath; we being in degrees of Perfection much more remote from the infinite Being of GOD, than we are from the lowest state of Being, and that which approaches nearest to nothing.³⁵

This is part of an argument about our classification of species of substances according to the "nominal essences" the mind makes, rather than to the real essences of the things themselves. Just as with corporeal substances, Locke continues, so with the immaterial species we may well surmise exist in the great world: in both cases, distinctions among species are made not as a reflection of their real essences (which we cannot know), but according to what we take to be concurrent observable characteristics of those species. The passage above ends therefore with: "And yet of all those distinct *Species*, for the reasons above-said, we have no clear distinct Ideas." Nevertheless, the (probable) picture of the universe as a vast harmony of both material and immaterial existences is important to Locke, since it serves as the very framework for his account of the limitations of the human faculties and of the extent of human knowledge.

The great merit of John Yolton's last book, *The Two Intellectual Worlds of John Locke*, has been to make us alive to the perhaps surprising importance of the role of the angelic world in Locke's thought, particularly in his *Essay*. As Yolton has shown, if the phrase "intellectual world" is often used by Locke to mean the world of human ideas (an epistemological sense), there are nevertheless a multitude of references in his writings to another "intellectual world," the world of God, spirits, and angels (the ontological sense of the phrase).³⁶ This second sense is closely linked to his chain-of-being ontology, coupled with a natural theological description of the world as a "stupendous," harmonious "fabrick" displaying God's attributes of wisdom, power, and goodness.

But what kind of study is the study of the intellectual beings? In *Some Thoughts concerning Education*, Locke says that both reason and revelation teach us about them. Whether spirits are to be considered a part of metaphysics, as they usually are, or of natural philosophy understood as "the Knowledge of the Principles, Properties, and Operations of Things, as they are in themselves," it does not really matter.³⁷ Yet, despite his lack of concern here as to the "science" the intellectual beings most properly belong to, in several of his other writings he wavered between ascribing them to natural philosophy or to theology. In his "division of the sciences" closing the *Essay*, he includes bodies, angels, spirits, and God himself in the province of natural philosophy defined as "the Knowledge of Things, as they are in their own proper Beings, their Constitutions, Properties, and Operations."³⁸ On the other hand, in an earlier note on the typology of knowledge, he listed God and spirits under "Theology."³⁹ In another such text, in which he reflects on the best way of dividing one's reading notes among various "heads," the (implicit) place of God and the angels seems to be distributed between what he calls

"Adversaria Philosophica" (notes on "the several order and species of things") and "Adversaria Historica" (notes on "the opinions or traditions to be found amongst men concerning God, creation, revelation, prophecies, miracles," which are the stuff of both ecclesiastical and sacred history).⁴⁰ In a later notebook called "Adversaria Theologica 94," compiled in 1694, i.e., after both the first edition of the *Essay* (1690) and the first edition of the *Thoughts concerning Education* (1693), he brings God, angels, man, and matter, as well as sacred history, under the head "theology."⁴¹ Similarly, in the *Conduct*, we learn that the "noble Study" of theology comprises the "Knowledge of God and his Creatures, our Duty to him and our fellow Creatures, and a view of our present and future State."⁴²

Inquiry into God's "contrivances" (including the natural world, other worlds, material and immaterial, events in sacred history, God insofar as he can be known, and, as we will see below, the Scriptures) is thus a type of endeavor at the crossroads of natural philosophy, natural theology, and divinity. It can be understood as tracing the field of a distinct program of study, for the use of the Christian philosopher. The program defines a "discipline" in its own right, which traces not only a domain of knowledge pursuit and the general guidelines of a method of study (based on the combined work of experience and reason) but also the domain of a discipline of the self and of the mind's progress in inquiry—a rational progress, but also a progress in rational affections. There is, in this respect, a relation between the representation of the angelic world and the Christian philosopher's education that deserves special mention.

Angels

For Boyle, the chief model of knowledge pursuit in all the domains covered by his extended notion of "experience" is the model of search. This model is not only, as I argued in chapter 4, informed by the idea of the "growth" of knowledge and of mind, but also, I want to claim here, governed by an ideal searching posture, represented by the figure of the angels. There are repeated references to the angels' searching and praising activity in Boyle's writings. In *High Veneration*, for instance, he writes, in the section devoted to the "wise contrivance" of man's redemption: "The Scripture tells us, that in the Oeconomy of Man's Salvation, there is so much of the *manifold Wisdom of God* express'd, that the *Angels themselves desire to pry into those mysteries*."⁴³ The pair manifold-wisdom-of-creation–searching-and-adoring-angels appears in other places as well, particularly in the *Christian Virtuoso*, part 2: "and though the blessed angels have, ever since the beginning of the world, been employed in contemplating,

celebrating, and serving God, yet, far from being weary of those blessed employments, they discover still, in that boundless ocean of perfections, things fit to heighten, even *their* wonder and veneration."⁴⁴

The angels figure here as involved in precisely the kind of activity that a Christian Virtuoso is called upon to perform: continued, humble search into God's truths, recognition of divine wisdom and power, admiration and praise of the Creator. For Boyle, the angels function as a horizon of human perfection in keeping with the central role of "experience" in his thought, understood as the search into, and the learning from, creation. If for a number of philosophers and theologians, the model of perfection was represented by Adam before the Fall in virtue of his direct access to the essences of things, the more apt model for an experimental philosophy seems to be the angels' continuous prying into God's manifold wisdom.⁴⁵ Even if the angels may be thought to see more deeply than man can hope for in this life, they do not see all at once and thus are themselves perpetual learners.

The angels are also present in Locke's reflections on the nature, limits, and proper use of human knowledge. Their chief function for him is not to represent the searching posture but rather to help trace the chain-of-being territory of the degrees of accomplishment of the faculties of created beings. In a number of places, he thinks it probable that the angels and spirits are endowed with capacities far exceeding those of man and such as might actually make possible a scientific natural philosophy. Spirits are likely to be able to "penetrate into the Nature, and inmost Constitutions of Things,"⁴⁶ as well as into the constitution of man himself;⁴⁷ they would possess perfect reasoning capacities, since they would be able to have a full view of everything that relates to a question;⁴⁸ they would have perfect memories and a capacity to retain all their past knowledge in a present picture,⁴⁹ as well as a much "perfecter way of communicating their Thoughts" than we have;⁵⁰ and they are most probably "more steadily determined in their choice of Good."⁵¹ The angels are thus, for Locke, a model of perfect science, virtue, and felicity, owing to their perfect or, at any rate, much more accomplished faculties than the human.

The topic of the capacities of the immaterial beings forms an important part of Locke's anthropological thought. A common theme of his reflections on the intellectual world is the correct assessment and legitimate improvement of the human capacities. An awareness of the vastness and variety of beings in the great structure of the universe and a related understanding of the degrees of perfection and imperfection of the faculties distributed among its layers are, for Locke, a route toward a rightful evaluation and improvement of the human powers.

Thus, for instance, in the *Essay* he suggests that an acknowledgment of the intellectual world would help man rightly assess his own place in the universe and would heal him of pride. The suggestion is framed as an exercise for the imagination: “he that will not set himself proudly at the top of all things” will be able to compare man’s lack of apprehension of the faculties of the superior intelligent beings with a worm’s ignorance of the senses and understanding of man. Such an exercise can both cure pride and habituate the mind to a sense of the “Variety and Excellency” of the created fabric of the universe, suitable to the “Wisdom and Power of the Maker.”⁵² A comparable exercise for the imagination with mind-enlarging effects is proposed in another passage, relating to the supposition of perfect angelic memory. Locke suggests that reflection on what it would be like to have more capacious faculties may itself open the mind toward a consideration of the perfections to be found on the various layers of the hierarchical universe, and thus toward its “stupendous” harmony.⁵³ Similarly, in *Some Thoughts concerning Education*, the study of spirits is recommended as a first step in the natural philosophical education of the young gentleman. The reason is that reflection on the angelic world opens (“enlarges”) the mind to the great expanse of the universe (even if an exact knowledge of its structure, nature, and species is not to be had) and to the collaboration of material and immaterial causality in the phenomena of the world (even if their inner mechanisms cannot be fully penetrated). Such habitual reflection would cure the mind of narrowness and prejudice.⁵⁴

In yet another passage, in one of the planned additions to the *Essay*, Locke speaks more directly of emulation: his subject there is disputation, one of the practices he is most adamant in reproving. In keeping with the idea of the perfect capacities of the angels, Locke reasons: “Whoever thinks of the elevation of their knowledge above ours, cannot imagine it lies in a playing with words, but in the contemplation of things, and having true notions about them, a perception of their habitudes and relations one to another.” At least on this subject, Locke advances, relative to our ill use of words and our bad disputing habits, we might overcome our limitations and had better emulate the angels: “we should be ambitious to come, in this part, which is a great deal in our power, as near them as we can.”⁵⁵

Reading Scripture

The careful study of Scripture was an exercise in which both Boyle and Locke engaged throughout their lives. Their developed thoughts on the

principles guiding scriptural reading are expressed in Boyle's *Style of the Holy Scriptures* and Locke's preface to the *Paraphrase*, but similar concerns are also present in Boyle's early "Essay of the Holy Scriptures,"⁵⁶ in his *Christian Virtuoso*, part 2, or in Locke's continual engagement with theological reading starting with the 1660s.⁵⁷ In what follows I would like to isolate the main hermeneutic guidelines Boyle and Locke proposed in these texts. For the present study, the interest of doing so is not primarily as a chapter in early modern biblical hermeneutics but rather as an exposition of their similar conceptions of the practice of scriptural reading, seen as a part of the general program of studying God's "contrivances." Their prescriptions in this sense are best seen as practical regimens for cultivating the mind's powers, rather than strict rule-bound methodologies or hermeneutic doctrines. The ethical (ethos-building) component of these prescriptions is reinforced by their reflections on a typology of readers, which echo the two philosophers' reflections on the typology of distempers of the mind and on the degrees of cure and cultivation.

Boyle's and Locke's hermeneutic principles, it will be seen, are consonant with a hermeneutic tradition that has been illuminated in Kathy Eden's work: a Christian humanist and patristic tradition of "charitable reading," which appropriated the Roman rhetorical tradition of "equitable reading." In this process of appropriation, the ethical principle of equity, together with the formal principle of *oeconomia* or accommodation, was transferred from legal thought to textual interpretation and further to biblical interpretation. What was thus defined was not so much a methodology as an interpretative praxis, meant to cultivate equity/charity as dispositions in the reader of the text.⁵⁸ The equitable/charitable reader, on this account, looks to the coherence or "oeconomy" of the text. To that end, he will perform a contextual, accommodative reading, which places one particular passage in its immediate textual context (through a *collatio locorum* or comparison of places), in its historical and linguistic contexts, as well as in the context of the character or person of the writer—the kind of reading that gives preeminence to the whole over the parts. He will also accommodate the meaning of the words to the author's meaning or intention (his *voluntas*).⁵⁹ With equity Christianized as charity, and *voluntas* as *intentio* or *spiritus*, equitable reading was refashioned as charitable or spiritual interpretation, which looks beyond the *gramma* to the *pneuma*, or in Augustine's Latin translation, beyond the *littera* to the *spiritus* of the divine text. The intention, or spirit, of the divine text is above all the promotion of *caritas*—the "*summa* of all scriptural teaching." Good reading will thus be guided by a "hermeneutics of charity," which "defines a disposition towards the text rather than any

doctrine, in that the discovery of *caritas* within the text not only finds support elsewhere—indeed, everywhere else—in the text but also qualifies the *voluntas* of the reader by qualifying his or her way of reading as equitable or, in Augustine's terms, spiritual in that it searches out the *voluntas* of the writer."⁶⁰

An equitable/charitable reading shapes an interpretative disposition that searches for illuminating contexts and for coherence, which may thus make sense of the whole, in light of the intention of the author. It is thus an "oeconomic" reading, whose aim is interpretative and ethical at once. The ethical dimension rests on the ethos-building effort of the reader whose practice of reading cultivates his own equity/charity. These principles are openly articulated in Boyle's and Locke's hermeneutic guidelines, which are governed by their insistence on the disposition of charity, which both makes possible and is furthered by the study of Scripture.⁶¹ A good summary of their position is Boyle's picture of types of reading in the *Christian Virtuoso*, part 2:

And thus most readers, and even many learned men, peruse the scripture so slightly, and desultorily, that so transient and superficial a view makes them overlook in it, a multitude of excellent and instructive things, and leaves them great strangers to those mysterious harmonies, and symmetries, that, lying deep, are less obvious. Whereas a diligent and devout peruser, furnished with the original languages, and other useful parts of learning, by attentively and assiduously reading those excellent writings, and carefully comparing place with place, phrase with phrase, and, in short, adding one help of interpretation to another, may discover excellent and mysterious truths, that are wholly missed by vulgar readers.⁶²

The task of the "diligent and devout peruser" is described in more detail in his *Style of Scriptures*. Boyle organizes his text as a series of responses to objections against the scriptural text. The core of his hermeneutics lies in his refutations of the charges that Scripture is "obscure," "immethodical," and "incoherent."

The charge of "obscurity," Boyle says, is to a large extent due to the proliferation of glosses, which succeed in clouding rather than in illuminating the text.⁶³ But it is true that the text itself mixes obscurity with clarity. This observation makes room for the Protestant principle of letting Scripture "interpret itself," i.e., let the clear passages illuminate the obscure ones, through a careful comparison of places. The *collatio locorum*, Boyle explains, not only defines the reader's interpretative activity but is also allied to a disposition engendered by the recognition of obscurity:

the observation should wake up his humility and act as an inducement to study further.⁶⁴ Boyle advocates an extensive practice of contextualization. To look rightly at one piece of text is to look at its position within the larger text, at the way it relates to a number of contexts, historical, cultural, or linguistic, as well as to the style and character of the author.⁶⁵ Those incapable of cultivating the patience and humility for doing so are "querulous readers," who charge Scripture with obscurity or triviality simply because they "look upon their own abilities as the measure of all discourses."⁶⁶ Continuous study, by means of an "attentive and repeated perusal," may bring more to light, while signaling the areas that are still clouded. In turn, obscure passages make us read the rest more carefully and thus better discover the meaning of the whole. To reinforce the point, Boyle invokes the Aesopian fable of the sons who, eager to discover the treasure their father promised was buried in the garden, keep tilling the land until it becomes fertile and the vineyard growing on it proves to be the actual treasure.⁶⁷ The meaning to be unearthed is thus the meaning of the *whole*, and the route to it is through a "tilling" of the text that attempts to make local clarifications throw light on its global intent.

Global intent is at the core of Boyle's response to the second charge, of lack of "method" or of "disjointed" method. A precise fault in reading is identified here again: the division in chapters and verses customary at the time⁶⁸ is a great impediment to understanding the way Scripture is actually more "discursive" than is believed. Additionally, as was the case with the first objection, another impediment is human vanity, which considers that everything is reducible to human measures. The book of nature and the book of grace share this peculiarity, Boyle says, that they cannot be "fetter'd to Humane Laws of Method."⁶⁹ The objection is due to a failure to see where the "method" of the sacred text lies: rather than a matter of plain, linear "Order of the Sections," it is inbuilt in "its being in Order to the Author's End."⁷⁰ Boyle exemplifies the point with the case of Saint Paul, whose epistles are so full of digressions they may well appear "immethodical" by usual standards: but we should rather see how all the apparently divergent strands actually tend toward the same end, an intent of the author that works as a subtle, if at first unapparent, organizing principle of the text. Boyle illustrates the idea by comparing Saint Paul's digressive discourse with a meandering river that, although apparently diverging from its course, not only actually tends to its end point but also manages to fertilize the whole land it traverses on its way: so Saint Paul, directing "his Course to his Main Scope," drives both meaning and reader to the destination by "meandering" through illuminating clarifications,

enriching enlargements, and edifying answers to objections.⁷¹ “Method,” then, should be understood in its basic sense, as a *via*, a way to a destination point. The fertilizing river image intensifies and deepens the land-tilling metaphor: if understanding is a matter of expecting the whole to bear the fruit of meaning, the organizing principle of the whole needs to be recognized in the *author’s intent*. The work of the reader is crucial here: by curbing his laziness, his impatience, or his presumption, he engages in a process of deciphering that, as guided by the main hermeneutic principles of the whole and the intent, “cultivates” both text and mind.

The suggestions of the first two answers are brought together and reinforced in the answer to the third objection, of “incoherence.” The main error here is due to the practice of reducing the Bible to a ready stock of “Sentences and Clauses,” i.e., to collections of *sententiae* or *florilegia*.⁷² This is the sure way to miss the coherence of the text and an easy way to using the biblical text for private ends. So is the practice of most divines, who do not look beyond the nuggets of text they have cut out of the body of Scripture, which they “Symphonize with their Tenets, not with their neighbouring Texts.” One should rather strive to interpret this or that difficult fragment by “symphonizing” it with the rest of the text, “and then, for our Opinions, rather to confirm them to the Sense of the Scripture, than wrest the Words of Scripture to Them.”⁷³ It is necessary, Boyle warns, that a good reader put together linguistic and historical context, the comparison of places, and the “speaker’s scope”: only with this interpretative apparatus mounted (in full honesty and humility) will the text start to appear in its “full dimensions,” as a “Systeme” of exquisite interrelations and divine purpose. Apparent incoherence will then be recognized for what it truly is: as yet undiscerned “symmetry,” or “wisest Oeconomy,” whose full scope will actually never reveal itself but be a perpetual object of study.⁷⁴ Reading with an eye to the meaning of the whole, the author’s end, and the economy of the text are the hermeneutic tools of the “Inquisitive and concern’d Peruser,” by contrast with the “Heedlesse vulgar Reader” for whom Scripture is an obscure, immethodical, incoherent text.⁷⁵ To become a good reader, one needs to start “cultivating” the text:⁷⁶ the reader will advance by degrees in his Scripture knowledge and will shed by degrees the “vulgarity” of his mind and soul.

Boyle sees the “two books” as complex structures expressive of divine “oeconomy”: by searching into the inbuilt correspondences and cross-references in the canonical writings, we “may discern upon the whole Matter, so admirable a Contexture and Disposition, as may manifest that Book to be the Work of the same Wisdom, that so Accurately compos’d the Book of Nature, and so Divinely contriv’d this vast Fabrick of the

World." In both books is manifested the same "Manifold Wisdom of God."⁷⁷ Boyle's good reader works with a conception of "text" and of "reading" that applies in similar terms to both books: nature and Scripture are similarly complex and harmonious "mechanisms" that need to be gradually and patiently unrolled if their "method" is to be grasped at all. The reading-as-unrolling process is, moreover, one that builds certain virtues in the reader: patience, humility, and gradual expansion of understanding come, in similar ways, with the reading of both of the divinely authored books.⁷⁸ The hermeneutic tools Boyle advocates do not, we have to note, amount to a precise method of interpretation. They seem rather to delineate a general program for a practice of reading that may be brought to fruition only by everyone's effort, where fruition is indeed the fruition of meaning *and* of the moral/understanding capacities of the reader's mind.

Locke is also committed to the Protestant principle of Scripture as a self-interpreting text and the only authority to be obeyed in theological matters. Self-interpreting, though, does not mean transparent.⁷⁹ Rather, Locke affirms the contextual principle of "oeconomic" reading: difficult passages should be read in their immediate as well as remote contexts and may thus be (at least partially) explained by relation to the meaning of the whole. This does not even mean steady progress toward ultimate complete clarification of meaning. That is most probably impossible to attain, and the purpose is to keep searching, rather than elucidate once and for all. This is the sense in which Locke reads 1 Corinthians 3:2 ("I have fed you with milk, and not with meat . . ."). Echoing the earlier 1 Corinthians 2:13, his paraphrase reads: "I could not apply my self to you as to spiritual men that could compare spiritual things with spiritual one part of scripture with an other and thereby understand the more advanced truths revealed by the spirit of god."⁸⁰ Locke places "comparing one part of Scripture with another" by the side of "comparing spiritual things with spiritual"—the *collatio locorum* by the side of, or rather as a means to, a charitable, "oeconomic" reading which looks for the "spirit" over the letter, or for the *voluntas* over the *scriptum*.

He begins his essay by enumerating what he thinks are the most important difficulties in interpreting the Pauline texts. He divides them into "internal" and "external" difficulties. The former are due to the nature of epistolary writings, to the language of the New Testament (with its concatenation of Greek terms and Hebrew or Syriac idioms or turns of phrase), as well as to Saint Paul's "Stile and Temper" (a "Man of quick Thought [and] warm Temper," whose "Plenty and Vehemence" are responsible for the many threads of thought woven into his parenthetical

and digressive discourse, and who often changes “the Personage he speaks in”). The latter point includes thus the “character” of the author in the contextual consideration of the text and also introduces the principle of reading for the unifying intent of the whole: Saint Paul’s discourse does have a “thread” or a “current” unifying the texture of his epistles.⁸¹

Locke dismisses the (enthusiastic) idea that Saint Paul must have been so transported when he wrote that his text became metaphorical beyond coherence. He does admit that the text is difficult, for the reasons enumerated above. Nevertheless his assumption is that the whole must be coherent, and the “thread of the discourse” is such that it can be followed. His reasoning is the following: Saint Paul’s office was to communicate the word of God to the people, so they can be instructed and convinced, and able to discuss and pass on the word. Moreover, he was no unfit vessel; therefore he “thoroughly digested” the Revelation, and thus it became “one well contracted harmonious Body” in his mind. There was a message, and the message was communicated. It follows that the message can be understood rationally and its light and evidence grasped by the mind (even if partially).⁸² Locke’s method of reading is in fact a general practical guideline informed by this (“oeconomic”) assumption: he simply recommends a repeated and continuous rereading of the text of each letter until its “Subject and Tendency,” or its “Views and Purposes,” in short Saint Paul’s “Drift and Design” in writing it, start to be grasped. The task of reading commanded by the *whole/intent* principles appears here again: it is through a “good general view” of structure and purpose (or structure-cum-purpose) that the “Drift and Aim” of the author may be discovered.⁸³

But this is no easy task, and in emphasizing the practical difficulty, Locke also signals the importance he places on the work of the reader over the establishment of methodized rules. Looking for the thread of the discourse requires “a very attentive Reader to observe, and so bring the disjointed Members together, as to make up the Connection, and see how the scatter’d Parts of the Discourse hang together in a coherent well-agreeing Sense, that makes it all of a Piece.” The “very attentive reader” will recognize the role of the digressions, most of the time devoted to reformulating and answering objections (this was indeed the point of Boyle’s land-fertilizing metaphor), and thus will identify Saint Paul’s “method” in the orientation of the whole multifarious discourse to the same “end.” In contrast, the “unwary, or over-hasty Reader” will rest in, and accuse the text of, uncertainty and incoherence.⁸⁴

The typology of readers, echoing Boyle’s, is an important part of Locke’s hermeneutic essay, although it is not mentioned in commentar-

ies that dismiss his method as uninteresting.⁸⁵ His section devoted to the external difficulties in reading Saint Paul's epistles identifies (in a manner similar to Boyle's) a number of problems that are the combined effect of erroneous practices and flawed readerly dispositions. Thus, by the practice of dividing the epistles into chapters and verses, the text becomes so "chop'd and minc'd" that its real "thread and coherence" are sure to escape the reader. Moreover, this encourages the other bad practice, of taking verses for aphorisms, which not only obscures the coherence of the text but provides the perfect tools for those who use the bits of text thus disjointed in order to confirm their own particular "system." Indeed, the greatest obstacle to understanding Scripture aright, in Locke's view, is the common tendency to tailor the text to the measure of one's own particular doctrine or interest and use it for defending one's own views in disputation. These are "partial Readers," readers of a "quicker and gayer Sight," "forward and warm Disputants" who read into the text what they please.⁸⁶ Both dogmatic readers (who "confirm themselves in the Opinions and Tenets they have already") and wavering readers (who let themselves be "distracted" with a hundred interpretations and "return from them with none at all") are equally "partial" readers.⁸⁷ Note the continuity between this analysis of reading practices and the anatomy of the bad judging dispositions in the *Conduct*. Here as there, prejudice and preoccupation, hastiness, or else laziness and ill-disposition are responsible for falling short of the task of rightful inquiry. Those who resist the premise of coherence do it not out of epistemological scruples but rather out of a self-serving love for their own narrowness, since "it requires so much more Pains, Judgment and Application, to find the Coherence of obscure and abstruse Writings, and makes them so much the more unfit to serve Prejudice and Pre-occupation when found."⁸⁸ The important point Locke makes here is that the attentive, humble exercise in trying to grasp the coherence and intent of the scriptural text could be in itself an exercise fit for curbing these bad, truth-failing, and mind-corrupting inclinations. The "earnest study" of Scripture is in itself capable of preserving us from the "infecting" errors stemming from "Sloth, Carelessness, Prejudice, Party, and a Reverence of Men." To resist such weaknesses is to be able to "compare spiritual things with spiritual things."⁸⁹

For both Boyle and Locke this is the type of reading that cures distempers and vanity. Coherence when found makes the text unfit to serve prejudice and preoccupation. To see the coherence is therefore to deny one's own partial self and to "symphonize" one's mind to the (divine) aim of the text. To cultivate the equity/charity of reading is to seek to transcend the partial human measures of truth and thus to cure the

“vulgarity,” “narrowness,” or “partiality” of mind. This is not to say that the text will become crystal clear: obscurities will remain, the reading will not be able to completely elucidate the meaning, and it will by no means be infallible. The reading principles are meant neither as a system of theology nor as a formal hermeneutic doctrine, but rather as a guideline for a practice—one that Boyle and Locke undertook out of a concern with their own salvation, and that they invite their readers to engage in along with them.⁹⁰

The expectation that such a “charitable” reading of Scripture will be shared with their own readers points to a parallel between the social aspects of the discipline of judgment I noted in the previous chapters and the social aspects of the discipline of scriptural understanding. The rightful inquirer’s work on his own mind was an endeavor undertaken both in solitude and amid the community of friends. Similarly, the charitable reader’s education takes place both within his own self and within the community of Christian philosophers. In a short essay of 1688, “Pacifick Christians,” Locke advocated the value of “love and charity in the diversity of contrary opinions” and defined charity as “an effectual forbearance and good will, carrying men to communion, friendship and mutual assistance one of another, in outward as well as spiritual things” (cf. Colossians 3:12–14). In the reading of Scripture as in the government of judgment, as well as in the general management of our earthly lives, the charitable friends’ assistance, as opposed to the imposition of dogmatic assertors, works together with God’s assistance toward “the enlightening of our understanding and subduing our corruptions.”⁹¹ The community of Christian philosophers, Locke thinks, fosters both the care of the self and the care of others.

Nourished by an early modern tradition of thought about the philosophical and religious care of minds, Boyle and Locke forged the emblematic figure of the Christian philosopher, whose domain of study encompassed the whole array of God’s “contrivances” (Scripture included), and whose endeavor was aimed at the double pursuit of truth and of a fortified mind. The core feature of the life program embodied by this figure is captured by the notion of the pursuit itself—the learning process, the *paideia*. Accordingly, the value attached to the exercise of the capacities of the mind lies not primarily in the finding of truth but in the very *search* for it. Honest search is by itself mind-liberating and cultivating, and truth is a horizon of direction and growth rather than an object of possession. As early as 1661, Locke was already formulating this core principle: “For if it be our duty to search after truth, he certainly that has searched after it, though

he has not found it, in some points has paid a more acceptable obedience to the will of his Maker, than he that has not searched at all, but professes to have found truth, when he has neither searched nor found it."⁹² In a similar vein, Boyle spoke of the "benefits" that not so much the knowledge of as the search for "divine truths" affords the student of the two books: "the actual Attainment of that Knowledge is not always absolutely Necessary, but a hearty Endeavour after it may suffice to entitle Us to them."⁹³

Conclusion

I do not expect that by this way the Assent should in every one be proportion'd to the Grounds and Clearness wherewith every Truth is capable to be made out, or that Men should be perfectly kept from Error: That is more than humane Nature can by any means be advanc'd to; I aim at no such unattainable Privilege; I am only speaking of what they should do who would deal fairly with their own Minds, and make a right use of their Faculties in the pursuit of Truth; we fail them a great deal more than they fail us. JOHN LOCKE, *OF THE CONDUCT OF THE UNDERSTANDING*

The central point I have defended in this book is that Robert Boyle's and John Locke's epistemological and methodological views were nourished by an early modern tradition of thought about the conduct of inquiry that is rooted in a regimen approach to the human mind. That approach involves an anatomy of capacities, limits, and distempers, as well as a view about the possibility and need of a cure and cultivation that may shape a virtuous inquirer. The regulation in question involves an education of the whole set of the mind's powers; it is at the same time a molding of character and is thus bound up with a way of life. In their writings, Boyle and Locke fashioned an *exemplary figure* that stood not so much for an image of perfection of that life as for the very paideic (perfecting) process leading to it. Both called it the Lover of Truth, and Boyle gave it the resonant name of the Christian Virtuoso.¹ It was indeed, I want to stress again, the process—the pursuit, the search, the “pilgrimage”—that this figure represented for the two philosophers. In the hands of the apologists of the Royal Society, the Christian Virtuoso and Boyle as his incarnation

could be turned into an iconic image of perfection, one whose capacity to guide historical understanding has rightly been challenged by Michael Hunter.² Hunter's alternative to that image is a historically rich private Boyle, a "great but complicated man," whose "scrupulosity" fed both his profound philosophy and his tortured conscience.³ I have suggested here that we do not need to delve into Boyle's conscience in order to find a historically meaningful alternative: his own Christian Virtuoso figure, if rightly understood, is challenge enough to the frozen iconic image. That figure, just like Locke's Lover of Truth, was primarily the figure of a seeker and a learner, one confronted at every step with the frailties and limits of his own mind, but one who strove to recognize them and submit himself to a lifelong discipline. To what extent Boyle and Locke themselves impersonated this figure in their own lives is a biographical question that has not been the prime concern of this study. I have rather addressed the intellectual historical question about the relation of this figure to the two philosophers' views on mind, reason, and knowledge pursuit, and about the intellectual and cultural resources that informed those views.

The Christian Virtuoso and the Lover of Truth were model figures of the human being engaged on a path leading to truth (or the truths of God knowable by man in this life) and to a rectified mind as aspects of the same process. The recent persona approach to the identity of early modern cultural actors suggests that we look at such figures as representatives of specialized offices—in this case the philosopher's or the natural philosopher's.⁴ This is a valuable suggestion, which makes us see how such offices were distributed across the early modern intellectual space, and surely there is such an "official" side to these two figures. It is also the case, though, that for Boyle and Locke, they were equally meant as exemplary postures of the *rational creature*. The Christian philosopher was not just a philosopher but also a model of humanity within a theistic worldview, carrying duties and responsibilities insofar as he was a human being. The comprehensiveness of this figure, I have suggested, echoes the transdisciplinary and, we might say, transofficial domain of the early modern physicians of the soul—one that also served the human being as primarily a human being, whether in its capacity as philosopher, Christian, or gentleman. This goes to argue in favor of the foundational role ascribed to the education of the mind in the line of thought investigated in this book, one that spelled out a life program for the human being aware of its relation to creation and to the Creator, and that, as such, was taken to precede, as well as ground, the various disciplines and offices. The study of the interplay between the dimensions of the public offices and those of this foundational office (whether theistically grounded or

not) may be apt to enrich the persona approach to the early modern and the Enlightenment cultures.

The figure of the Christian philosopher expressed Boyle's and Locke's conception of the moral-religious value of the pursuit of knowledge. I have argued that there are two early modern interlacing contexts relevant to this conception: the experimental philosophical programs developed by Bacon and the Royal Society virtuosi, and the early modern *cultura animi* tradition. These contexts testify to the fluidity of the disciplinary boundaries in early modern thought and to the usefulness that an investigation of the intellectual landscape of the time in its own terms has for historical understanding. The regimen approach to the problem of knowledge, which I argued shaped early modern English experimental thought, was also developed in a body of what is generally known as moralist, pastoral, or psychological literature. The historical point of this study has been that this literature carves a rich early modern intellectual domain in which English experimental thought can be meaningfully placed. Bacon's and the virtuosi's philosophical programs can thus be illuminated from a new perspective and their regimen component better grasped. In turn, the much discussed Baconian legacy of the Royal Society is apt to be enriched with a hitherto little appreciated aspect. The references to Bacon's idols in the virtuosi's texts, as in Boyle's or Locke's, have not escaped critical attention, but they have been subsumed in to discussions of natural philosophical methodology in its own right. It can now be appreciated, I hope, that the later seventeenth-century English philosophers' interest in the Baconian idols points to the therapeutic value they attached to the experimental way of inquiry, and testifies to the combined Baconian and *cultura animi* legacy that substantiated this notion.

The approach to knowledge surveyed here takes the form of *anthropological questions*. I concur thus with Peter Harrison's thesis about the role of notions of human nature in the early modern views of knowledge and its foundations.⁵ However, I disagree with his conclusions relative to the emergence of an English procedural, person-effacing view of method, premised on a Protestant Augustinian anthropology that denied individuals the capacity for virtuous self-transformation. The anthropology at work in the English experimentalists' approach to knowledge, I have argued instead, was an integral part of a therapeutic conception. That conception was in fact a common feature of the *cultura animi* literature, across its various degrees of Augustinianism. True, partisans of one form of therapy could deny the validity or efficacy of the others, but one common ground was represented by the conceptualization of the therapy in

terms of an inner transformation. Both “Socratic medicine” and “spiritual physick” gave the inner man another “tincture” by reorienting the habits of the mind or of the heart, and thus proved their “usefulness” as life regimens. The English experimental philosophers, I have argued, worked with a view of human nature that was moderately Augustinian, and they allowed the exercise of reason a crucial role in man’s reformation and “perfection.” They shared this view with the similarly moderate philosophical and religious physicians of the soul in seventeenth-century England. They also emphasized the “usefulness” of the experimental pursuit of knowledge in similar terms, as a constant counterpart of the new emphasis on the production of useful works for the public.

The regimen approach is also apt to modify our picture of Boyle’s and Locke’s notion of the *limits of reason* and of their views about the relation between reason and revelation. Both held the anti-Deist position that there are revealed truths that natural reason alone cannot discover, either in principle or in actual fact. Both also assigned reason the anti-enthusiastic task of authenticating revelation before the mind could receive it with assurance. But, in their view, reason was also a learning capacity. From this perspective, there was no sharp distinction between truths of reason and truths of revelation: both were taken to be able to inform reason and to lead to a growth in understanding as well as in epistemic and moral virtues. The work of reason—a work of discovery, examination, and understanding, coupled with one of reorienting the mind’s emotions—was conceived as a dynamic *paideia*. Complete knowledge, infallible certainty, and security from error in the study of both natural and supernatural things, they agreed, are beyond human capacity. There are indeed limits to human reason, and recognizing them aright is part of man’s duty of fair self-assessment. But the limits-of-reason theme (well emphasized in Boyle’s case by Jan Wojcik)⁶ goes together in their thought with the less appreciated theme of the “perfecting” of the mind, within the territory of those limits.

The latter theme also permeates the well-known *skepticism* and *probabilism* of early modern English experimental philosophy. I have argued that the drawing of epistemic charts of degrees of the certain and the probable is only one part of the story here. This epistemic territory not only traced boundaries for the human capacities but also indicated the task of a work on the mind—a work of self-assessment invested with a therapeutic capacity, as well as a work of mind-ordering regulation of assent. The virtuosi reinvested these epistemological categories with anthropological-therapeutic roles. Thus, for instance, to hold findings or propositions as probable was a requirement that pointed to the need to

recognize, on the one hand, that such findings and propositions could not capture the “richness” of the world, and, on the other, that they needed to be acknowledged as “temporary” or “probationary” and the (distempered) impulse to see them as definitive resisted. The virtuosi’s mitigated skepticism acquired thus a therapeutic value, and their epistemic modesty was conceived as a virtue in the strong sense of the term. We can appreciate this aspect of early modern experimental skepticism and probabilism, I have suggested, once we try to make sense of the analysis of mind distempers and regimens to which it was moored.

It is against the same background, of an anthropological-therapeutic account of the human mind, that one central line of the defense of *experimental* investigation was constructed in England, in ways that may differ in their details from Bacon to Boyle and Locke, but that also preserve a core common element. That common element involves a revaluation of the very notion of experience, now highlighted as a source of knowledge in a new way, set in opposition with the Aristotelian notion of experience as bound to a theoretical system that it serves only to illustrate. Experience (including both observation and experimentation) acquires indeed a new authority, often legitimated by reference to the limits-of-reason theme: natural (as well as theological) truths are simply not imprinted on human minds and therefore cannot be learned by the self-involved exercise of the intellect alone. But these themes, I have shown, are integrated within the analyses of the distempers of the mind, in such a way that the speculative and the experimental ways of inquiry are evaluated in terms of their potential for aggravating or alleviating the corrupt tendencies of the mind. At stake, then, is not only a conception of the legitimate sources of knowledge (itself rooted in anthropological considerations) but also a firmly articulated view about the quality of the mental activity geared by the two types of inquiry. This is already a Baconian tenet, which Boyle, Locke, and the virtuosi also share: speculation springs from and in turn fosters distempers, while the experimental “reading” of the books of nature and Scripture starts with and in turn cultivates a set of moral and intellectual virtues.

The topic of the typology of readers of the “two books,” which I have emphasized in this context, is also apt to throw light on the demands the experimental *askesis* placed on those called to engage in it. Glanvill captured the gist of the idea when he wrote that experimental philosophy was “not the only *Catholick* way of *cure*” but “’tis a *remedy* for those that are strong *enough* to take it.”⁷ The severity of the demands of the work on the self involved in this program of inquiry dissolves facile dichotomies between “optimistic” and “pessimistic” views of hu-

man capacities, or between the “democracy” and the “elitism” of the new philosophy. I have commented on the inaccuracy of reading Locke, for instance, as a promoter of Enlightenment optimism about human reason who was nevertheless disappointed in his expectations and fell into an uneasy pessimism. For Locke, as for Boyle, Bacon, and the *cultura animi* tradition, reason and the human mental capacities in general were inscribed in a multilayered picture: the distempers, the cure and cultivation, and the healthy or virtuous condition were all aspects of the mind, and all could be seen as “natural” to a human being at the various stages of its progress. It was this progress that could make a “rational creature,” but it was a demanding and selective endeavor. The way was open to all, yet few proved up to the task.

If the English experimentalists’ epistemology and methodology had such an indelible ascetic component, so did their *natural theology*. It, too, was conceived as a practice for the mind’s powers, informed by a specific anthropological conception. This reading differs from current interpretations. According to Peter Harrison, the late seventeenth-century physico-theological project, aimed at providing “evidence of divine providence and design” in nature, worked with the assumption that divine design could be fully discerned. Consequently, the state of the human capacities in relation to the prospects of knowledge no longer constituted a problem.⁸ Steven Shapin describes the project of the early modern English “culture of natural theology” in a similar way: natural philosophers were “engaged in matching their knowledge to that of the Creator.”⁹ With the vocabulary I explored in chapter 6, this would be to say that natural theology rested on the assumption of an unproblematic proportionate match between mind and world. I have shown that in Boyle’s and Locke’s case this is not so. They rather worked with a nuanced understanding of the disproportion between mind and world, and their natural theology, like their experimental methodology, rested on a subtle conception of the interplay between proportion and disproportion. The result of this interplay was the core requirement of a continuous search, whose value lay not so much in the logical demonstrations of the existence of God as in the cognitive-cum-affective transformations wrought in the minds of the students of God’s works. It was indeed the quality of the search that differentiated the “diligent” from the “vulgar” inquirers.

I have thus defended the claim that for the philosophers analyzed in this book, the problem of knowledge was construed as a problem of the ordering of minds. The key consequence of this perspective is a conception of *method* that invests it with the role of an internal regimen for irregular or weak minds. Boyle’s and Locke’s rules for conducting

inquiry, regulating assent, or reading Scripture came in the shape of general, nonformalized guidelines, as had Bacon's aphoristic directions for inquiry. In all these cases, we are not yet at the stage of what Steven Shapin has described as the modern cult of Method, invariant, apersonal, and objective. But even the *early modern* methods, Shapin writes, already rested on the principle that the rules could be "formalized, written down, transmitted with ease from one person to another, and implemented by each person so as to yield reliable knowledge," although it is true that in that period "none of these formal prescriptions of Method was securely institutionalized."¹⁰ But apart from the lack of firm institutionalization, my investigation has challenged the very notion of a formalized, written-down method, whose only relation to the person was that it helped keep idiosyncrasies at bay. Shapin also acknowledges the existence of a "providentialist conception of the knower" as an exception to the formalized method idea.¹¹ I have here emphasized not the exceptionalist idea of the researcher divinely inspired (which Boyle did hold at times), but the ordinary-conditions notion that rules are not to be formalized and learned but incorporated and, as it were, lived. The experimentalists' talk of "dispositions" and "tempers" of the mind that both precede and issue from the following of rules of inquiry makes sense only if we appreciate the extent to which their methods were *not* formalized and written down for the use of effaced inquirers.

Besides the notions of the incorporation of rules and of the consequent development of stable mental habits, another characteristic of this line of thought that argues against the impersonal method idea is a view of the work of reason that did not separate it from the emotional and volitional aspects of the life of the mind. The early modern relation between *reason and the emotions* is still in need of exploration, and I hope I have added to this line of research. In the texts I have analyzed, the interplay of cognition, emotion, and volition was crucial both in the diagnosis of the distempered mind and in the formulation of its regimen. The counterpart of the integrated accounts of the passions and errors of the mind was the framing of the regimen as a course for the regulation of all of the mind's movements: a governing of assent, a strengthening of the will, and a reorientation of love and desire.

The context of the *cultura animi* literature serves to point out the pervasiveness of this conception in early modern culture, as well as the complexity of the generic and disciplinary approaches that nourished it. Further exploration of this literature in tandem with the more familiar developments in the philosophical and scientific literature of the time, both in England and on the Continent, may throw light on the early

modern legacy in the eighteenth-century reconfigurations of the disciplines concerned with the *natural history of the human kind*. Often explicitly indebted to the Baconian and Lockean projects, the Enlightenment saw a proliferation of such histories of the human faculties across the domains of medicine, theology, moral philosophy, logic, and metaphysics (the latter two often understood as analyses of the understanding with a view to its conduct), with an increasingly explicit “psychological” and “anthropological” dimension and with a pedagogical or even therapeutic concern.¹² A vigorous tendency of the eighteenth-century logics, in particular, as well as of the books of advice on studying and thinking well in several quarters of the European Republic of Letters, was to ground a practical program for the education of the faculties in a natural history of the understanding.¹³ As such, they promoted an approach to the human mind that was jointly experimental and practical, in contrast to the theoretical and formalized style of both the scholastic logics and the scholastic science of the soul, from which they still felt the need to distance themselves. If their explicit debt was to Locke or Bacon, we can now begin to see that the impetus for this movement grew within a wider early modern culture of regimens.

I have proposed that the experimentalists worked with a notion of method-as-internal-regimen rather than with a notion of method-as-formalized-procedure. A related conclusion is that their view of what was later to be called *objectivity* was also rooted in a conception of the regimen and the virtues of the mind. Modern objectivity is usually associated with values that obtain at the communal level and thus rest on the erasure of the personal. There is no place for the virtues in this picture. However, an alternative proposal, offered by Lorraine Daston and Peter Galison in their recent study on the history of scientific objectivity, is that the willing erasure of the defining feature of a person (her will-centered subjectivity), which characterizes modern objectivity, should itself be seen as an epistemic virtue, since it is acquired through techniques of the self.¹⁴ While this is a stimulating suggestion, it remains an odd notion to think of the epistemic virtues in terms of a removal of the personal. The training of the modern “scientific self” into apersonal objectivity is indeed governed by a code of *values* and can surely be seen in terms of a pedagogical process, but we may wonder to what extent it can be said to cultivate a set of *virtues* in any recognizable sense of the term. It seems to me that the virtues do need to be seen as features of a person, and the recent trends in virtue epistemology to which I alluded in chapter 5 still work with a robust “person” notion. Perhaps recognition of the person requires a “self” notion that is indeed richer than the “will-centered

self,” which Daston and Galison have identified as the relevant self of post-Kantian modernity. I have argued that the early modern perspective investigated in this book construes the features of objectivity, such as impartiality or honesty, as personal virtues that cross the moral-intellectual divide. In terms of the “self” notion implicit in these accounts, it may be said that the English experimental philosophers work with a self that is not reducible to the (subjective) will but is one in which assent, desire, love, passions, and will interact in multifarious ways. In turn, what they cultivate in their educational programs is not a “will to willessness” but an ordering and rightful reorientation of the whole array of such mental activities. The outcome of the regimen thus framed is indeed a “cure” of the mind’s “partial” notions and loves, yet the cure does not entail an erasure of the person itself. It is rather geared toward the cultivation of a “universal” temper of the mind, one in which rightly ordered ways of judging, feeling, and willing become stable habits of the person. Objectivity-as-universality thus understood is possibly more of a virtue than the modern notion. In any event, Daston and Galison have suggested links between the history of objectivity and the history of the self that invite further explorations. I hope this study can offer insights to that end, as well as new ground on which these histories can interact with today’s virtue (or regulative) epistemologies.

The *social dimensions* of the early modern approach to the problem of knowledge, which have been emphasized by social history, can also be reevaluated from a regimen perspective. Objectivity and other features of the modern ethos may indeed be fruitfully approached as values that come into play at a social, communal level. To what extent they can be seen as epistemic virtues of individual inquirers is a question, we have seen, that is beginning to be asked. I have proposed that, in the early modern context, the social dimensions of the question of knowledge may be seen not only in terms of strategies for the *validation* and *recognition* of knowers in the social space but also as intimately involved with the question of the *education* of knowers. Self-mastery, for instance, was valuable to Boyle not simply because it could be made visible as a social instrument that ensured credibility¹⁵ but also, and primarily, because it served the ordering of the mind that went into the making of a rational creature. It was on such well-ordered minds, indeed, that social order was felt to rest. Moreover, for the virtuosi, the community was not simply a tool for the validation of identities or scientific results but also a site for mutual assistance, issuing, among other things, in the government of individual selves.

The key notion I have emphasized throughout this work is that of an

education of the mind. This notion was at the core of what I have described as an early modern culture of regimens, and its impact on English experimental philosophy resulted in a reorganization of the conception of the pursuit of knowledge around the figure of *the learner*. It was a Socratic and a Christian figure at the same time, and Boyle and Locke contributed the most in the early modern English space to its establishment as an emblematic cultural figure. That figure is still with us, whether we allow it its Christian dimensions or not, and we are apt to see the attitude it represents not only as a value but also as a virtue. I end with the description of this attitude in Roberts and Wood's contemporary account of an (early-modern-inspired) regulative epistemology:

It is the attitude of the perpetual student, and this attitude is a self-understanding: I do not have the final word on things; though I know a few things, my understanding is far less than it might be, and I have much to learn.¹⁶

Abbreviations

AT	René Descartes. <i>Oeuvres de Descartes</i> . Ed. Charles Adam et Paul Tannery. 11 vols. Paris: CNRS/Vrin, 1964–74.
Boyle, <i>Corr.</i>	Robert Boyle. <i>The Correspondence of Robert Boyle, 1636–1691</i> . Ed. M. Hunter, A. Clericuzio, and L. M. Principe. 6 vols. London: Pickering and Chatto, 2001.
CHRP	<i>The Cambridge History of Renaissance Philosophy</i> . Ed. Charles B. Schmitt, Quentin Skinner, Eckhard Kessler, and Jill Kraye. Cambridge: Cambridge University Press, 1988.
CHSCP	<i>The Cambridge History of Seventeenth-Century Philosophy</i> . Ed. Daniel Garber and Michael Ayers. 2 vols. Cambridge: Cambridge University Press, 1998.
CSM	René Descartes. <i>The Philosophical Writings of Descartes</i> . Ed. and trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch. 2 vols. Cambridge: Cambridge University Press, 1984–85.
CSMK	René Descartes. <i>The Philosophical Writings of Descartes</i> . Ed. and trans. John Cottingham, Robert Stoothoff, Dugald Murdoch, and Anthony Kenny. Cambridge: Cambridge University Press, 1991.
ELN	John Locke. <i>Essays on the Law of Nature</i> . Ed. W. von Leyden. 1954, 1988; Oxford: Clarendon Press, 2002.
Locke, <i>Corr.</i>	John Locke. <i>The Correspondence of John Locke</i> . Ed. E. S. De Beer. 8 vols. Oxford: Clarendon Press, 1976–89.
NE	Aristotle. <i>Nicomachean Ethics</i> . Trans. Christopher Rowe, with commentary by Sarah Broadie. Oxford: Oxford University Press, 2002.
OFB	Francis Bacon. <i>The Instauration Magna Part II: Novum Organum and Associated Texts</i> . Ed. Graham Rees with Maria Wakely. Oxford: Clarendon Press, 2004. (The Oxford Francis Bacon, vol. 11.)

ABBREVIATIONS

- ST* Thomas Aquinas. *The Summa Theologica*. Trans. Father Laurence Shapcote. Rev. Daniel J. Sullivan. 2nd ed. 2 vols. Chicago: Encyclopaedia Britannica, 1990.
- STE* John Locke. *Some Thoughts concerning Education*. Ed. John Yolton and Jean Yolton. Oxford: Clarendon Press, 1989.
- WFB* Francis Bacon. *The Works of Francis Bacon*. Ed. J. von Spedding, R. J. Ellis, and D. D. Heath. 14 vols. 1857–74; Stuttgart-Bad Cannstatt: Friedrich Frommann Verlag—Günther Holzboog, 1963–94.
- WRB* Robert Boyle. *The Works of Robert Boyle*. Ed. M. Hunter and E. B. Davis. 14 vols. London: Pickering and Chatto, 1999–2000.

Notes

INTRODUCTION

1. Hooke, *Micrographia*, 6.
2. *Ibid.*, 1.
3. Sprat, *History*, 342–43.
4. Bacon, *Valerius Terminus*, WFB, 3: 244–45; *Advancement II*, WFB, 3: 437; “Praefatio,” *Instauratio Magna*, WFB, 4: 20. In quoting Bacon’s Latin texts, I will use the Latin titles but will give the volume and page of the English translations, with the addition of the volume and page of the Latin versions (in parentheses) where relevant.
5. Bacon, “Distributio Operis,” WFB, 4: 23 (1: 135); *Novum Organum* I.ii, WFB, 4: 47 (1: 157); II.x, WFB, 4: 127 (1: 235).
6. Boyle, *Things Above Reason*, WRB, 9: 382; Locke, *Conduct* §12, 47.
7. Boyle, *Things Above Reason*, WRB, 9: 371; Locke, *Essay* IV.xiv.2, 652. This is possibly an echo of Matthew 5:48 (“Be ye therefore perfect”), as well as of ancient philosophical and religious sources talking of the “perfecting” of man through the exercise of reason (e.g., Seneca, Ep. CXXIV, *Workes*, 491–92) or through religious exercise (e.g., Augustine, *City of God* X.iii, 3: 263).
8. I will use the term *paideia* with reference to the ancient Greek-Roman “education of the soul,” famously investigated in Jaeger, *Paideia*.
9. Haakonssen, “Idea of Early Modern Philosophy,” 112–14. For other critiques of the “epistemological paradigm,” see James, *Action and Passion*, 20; Hatfield, “Epistemology and Science”; Schneewind “Globalization,” 174; Condren et al., “Introduction”; Harrison, *Fall of Man*, 8–9, 86–87.
10. Hadot, *Philosophy as a Way of Life; What Is Ancient Philosophy?*

11. For Descartes and his *Meditations*, see Hatfield, “Senses and the Fleshless Eye”; Vendler, “Descartes’ Exercises”; Rubidge, “Descartes’s *Meditations*”; Sepper, “Texture of Thought.” For the mathematical and natural philosophical projects of Descartes, Pascal, and Leibniz, see Jones, *Good Life*. For the German metaphysical and civil philosophies, see I. Hunter, *Rival Enlightenments*.
12. See Gaukroger, *Francis Bacon* and “*Persona*”; Daston and Sibum, “Scientific Personae”; Condren et al., “Introduction”; Condren and I. Hunter, “*Persona*.”
13. Gaukroger, *Francis Bacon*; I. Hunter, “University Philosopher”; Cottingham, *Philosophy and the Good Life* and “Descartes as Sage.”
14. Cottingham, “Descartes as Sage.” See also Davies, *Descartes*.
15. Harrison, “Natural Philosopher” and *Fall of Man*. See also Painter, *Depravity of Wisdom*.
16. Anstey, “Experimental versus Speculative Natural Philosophy.”
17. Vickers, “Bacon’s So-Called Utilitarianism”; Condren, “*Persona*,” 82.
18. I discuss the relevant literature in chapter 3.
19. The loose, nonformalized nature of Locke’s and Boyle’s rules has been discussed in Shapin, *Social History of Truth*, chap. 5; Sargent, *Diffident Naturalist*, chap. 5 and Conclusions.
20. Harrison, “Natural Philosopher,” 219–26; Gaukroger, *Emergence of a Scientific Culture*, 243.
21. Shapin and Schaffer, *Leviathan and the Air-Pump*; Daston, “Moral Economy of Science.” More recently, Daston and Galison (*Objectivity*) have suggested that modern objectivity may be seen as an epistemic virtue. I discuss this matter in chapter 3.
22. Shapin, *Social History of Truth*.
23. Elias, *Civilizing Process*, chap. 1; Miller, *Peiresc’s Europe*, 70.
24. The dimensions of early modern “enthusiasm”—which, besides the religious type, included speculative philosophy, but also, for its enemies, the experimental philosophy itself—are treated in Heyd, “*Be Sober and Reasonable*.” On Locke’s critique of enthusiasm, both religious and philosophical, see Jolley, “Reason’s Dim Candle.”
25. Shapin and Schaffer, *Leviathan and the Air-Pump*, 332.

CHAPTER ONE

1. Bacon, “Letter to Savill,” *WFB*, 7: 97. The “Letter” was written sometime between 1595 and 1604 and published posthumously in 1657.
2. *Ibid.*, 99.
3. *Ibid.*, 101–3.
4. *Ibid.*, 98.
5. I will be using this unusual phrase in order to render Bacon’s notion of the operation upon the mind, which—as will be seen—covers all the senses of

- the verb “to temper”: adjust (the pitch of an instrument), moderate (dispositions), and strengthen (materials).
6. Cf. a “rhetorical-legal model of knowledge”: Gaukroger, *Francis Bacon*, chap. 2; *Emergence of a Scientific Culture*, chaps. 5 and 6.
 7. Gaukroger, “Persona,” 28; *Emergence of a Scientific Culture*, 208.
 8. Gaukroger, *Francis Bacon*, 127, 131; *Emergence of a Scientific Culture*, 206.
 9. Gaukroger, *Francis Bacon*, 2.
 10. Harrison, “Natural Philosopher,” 219–26.
 11. Gaukroger, *Francis Bacon*, 127.
 12. Bacon sometimes discusses the operations of the mental faculties in terms of *motions* of the mind, e.g., when referring to the planned natural histories of such *motibus mentalibus* as memory, judgment, or composition and division in *Novum Organum* I.cxxvii, *WFB*, 4: 112 (1: 220). Whether such motions are to be attributed, in Bacon’s scheme, to the rational or to the sensible (corporeal) soul is still a matter of debate: see the discussion and literature cited in Tonelli Olivieri, “Galen and Francis Bacon.”
 13. Bacon, *Advancement II*, *WFB*, 3: 394–95.
 14. *Ibid.*, 437.
 15. Bacon, *De Augmentis V*, *WFB*, 4: 405.
 16. Bacon, *Advancement II*, *WFB*, 3: 409–10.
 17. James, *Action and Passion*, provides an illuminating account of the relevance of seventeenth-century reflections on the passions not only to the moral philosophy but also to the metaphysics and epistemology of the time. See also Gaukroger, *Soft Underbelly of Reason*.
 18. Bacon, *Meditationes Sacrae*, *WFB*, 7: 244. On Bacon’s early critique of Puritan zeal, see Gaukroger, *Francis Bacon*, 68–70.
 19. Bacon, *Meditationes Sacrae*, *WFB*, 7: 247, 248.
 20. Bacon, “In Praise of Knowledge,” *WFB*, 8: 123.
 21. Bacon, “Of Truth,” *Essays*, *WFB*, 6: 377–78.
 22. Bacon, “Proemium,” *Instauratio Magna*: “the primary notions of things” (*notiones rerum primae*) are “false, confused, and overhastily abstracted from the facts” (*WFB*, 4: 7 [1: 121]); “Praefatio,” *Novum Organum*: “unsound doctrines and . . . vain imaginations” (*doctrinis inquinatis . . . et vanissimis idolis*) (*WFB*, 4: 40 [1: 152]); *Novum Organum* I.xxiii: “empty dogmas” (*placita quaedam inania*) (*WFB*, 4: 51 [1: 160]). For the previous history of this term, see the comments in OFB, 11: 506–8; McCaskey, “*Regula Socratis*,” 203–7.
 23. Bacon, “Distributio Operis,” *WFB*, 4: 27 (1: 139); *De Augmentis V*, *WFB*, 4: 431 (1: 643).
 24. Instructive discussions of the Baconian doctrine of the idols can be found in Gaukroger, *Francis Bacon*, 122–27; Zagorin, *Francis Bacon*, 79–89; Urbach, *Francis Bacon’s Philosophy of Science*, 83–106. Urbach argues for the closeness of Bacon’s and Popper’s conceptions of good and bad science, despite Popper’s criticism of Bacon.
 25. Bacon, *Advancement I*, *WFB*, 3: 292.

26. E.g., *Redargutio*, in *Fundamental Texts*, 120; *Novum Organum* I.ix, WFB, 4: 48; “*Distributio Operis*,” WFB, 4: 27.
27. Bacon, *Valerius Terminus*, WFB, 3: 250; *Advancement I*, WFB, 3: 292.
28. Bacon, *Advancement I*, WFB, 3: 284; *Novum Organum* I.lxxxi, WFB, 4: 80.
29. Bacon, *Valerius Terminus*, WFB, 3: 244–45.
30. Bacon, *Advancement I*, WFB, 3: 282–85.
31. *Ibid.*, 285, 292; *Novum Organum* I.lxxxii, WFB, 4: 80.
32. Bacon, *Valerius Terminus*, WFB, 3: 241; *Novum Organum* I.xli, WFB, 4: 54 (1: 163–64).
33. Bacon, *Advancement I*, WFB, 3: 292–93.
34. Bacon, *Novum Organum* I.liv, WFB, 4: 59 (1: 169).
35. *Ibid.*, I.xlvi–xlvi, WFB, 4: 56–57 (1: 166).
36. *Ibid.*, I.xlix, WFB, 4: 57–58 (1: 167–68).
37. Bacon, *Advancement I*, WFB, 3: 293.
38. Bacon, *Novum Organum* I.lxvii, WFB, 4: 68–69.
39. *Ibid.*, I.xix, WFB, 4: 50.
40. For discussions of Bacon in the context of late Renaissance debates on methods of discovery versus methods of presentation, see Gaukroger, *Francis Bacon*, 37–44; Jardine, *Francis Bacon*, chaps. 2 and 3. On the various conceptions of “method” in the early modern period, see Dear, “Method and the Study of Nature.”
41. Bacon, *Novum Organum* I.xx, WFB, 4: 50 (1: 160). Cf. also *Advancement II*, WFB, 3: 392.
42. Bacon, *Novum Organum* I.li, WFB, 4: 58.
43. *Ibid.*, I.lx, WFB, 4: 61–62 (1: 171–72).
44. *Ibid.*, I.xxviii, WFB, 4: 51–52.
45. *Ibid.*, I.lxxvii, WFB, 4: 76–77 (1: 185–86).
46. *Ibid.*, I.xlv, I.xlviii, I.lv, I.lvii, WFB, 4: 55, 57, 59, 60 (1: 165, 166–67, 169, 170).
47. Bacon, *Advancement I*, WFB, 3: 288.
48. *Ibid.*, 290–91; *Novum Organum* I.lvi, I.lxxvii, WFB, 4: 59–60, 76–77.
49. Bacon, *Advancement I*, WFB, 3: 292; *Novum Organum* I.lxxxvi, WFB, 4: 85.
50. Bacon, *De Augmentis V*, WFB, 4: 432.
51. Bacon, *Advancement II*, WFB, 3: 432–43.
52. Cf. also “Of Friendship,” *Essays*, WFB, vol. 6.
53. Cf. also “Advice to Rutland,” WFB, 9: 13; “Of Studies,” *Essays*, WFB, vol. 6; “Colours of Good and Evil,” WFB, 7: 77; and the sections on reading and studying placed as appendices to the Art of Tradition in both the *Advancement* and *De Augmentis*.
54. Cf. also “Of Nature in Men,” “Of Custom and Education,” *Essays*, WFB, vol. 6.
55. Bacon, *Advancement II*, WFB, 3: 441.
56. Bacon, *Valerius Terminus*, WFB, 3: 246.

57. Bacon, *Novum Organum* I.lxix, WFB, 4: 70. In *De Augmentis* VII, the investigation of the tempers and distempers of the mind is recommended as the “groundwork of the doctrine of remedies” (WFB, 5: 20). See also Box, “Bacon’s Moral Philosophy,” 272–73; Jalobeanu, “Experimental Philosophers.”
58. Bacon, *Temporis Partus Masculus*, in *Fundamental Texts*, 72.
59. Bacon, *Advancement* II, WFB, 3: 444–45; *De Augmentis* VII, WFB, 5: 30.
60. Bacon, “Advice to Rutland,” WFB, 9: 8.
61. *Ibid.*, 15.
62. Bacon, *Advancement* II, WFB, 3: 423.
63. *Ibid.*, 427.
64. Bacon, “Distributio Operis,” WFB, 4: 27; *De Augmentis* V, WFB, 4: 431.
65. Bacon, *Valerius Terminus*, WFB, 3: 245.
66. Bacon, “Prometheus,” *De Sapientia Veterum*, WFB, 6: 752.
67. Bacon, *Advancement* II, WFB, 3: 445.
68. *Ibid.*, 428.
69. These are two of the “benefits” of learning listed in *Advancement* I, WFB, 3: 302, 315.
70. *Ibid.*, WFB, 3: 315.
71. E.g. in evaluating novelty, or death; *ibid.*, 314–15.
72. *Ibid.*, 314.
73. Bacon, “Advice to Rutland,” WFB, 9: 15.
74. Bacon, “In Praise of Knowledge,” WFB, 8: 123.
75. *Ibid.*, 125, 126.
76. Bacon, “Proemium,” *Instauratio Magna*, WFB, 4: 7; “Distributio Operis,” WFB, 4: 32; *Novum Organum* I.i, WFB, 4: 47.
77. Bacon, “Praefatio,” *Instauratio Magna*, WFB, 4: 21.
78. Vickers, “Bacon’s So-Called Utilitarianism.” See also Sargent, “Francis Bacon,” 128–29; Condren, “*Persona*,” 82. For an account of the “operative” nature of Baconian “utility,” see Perez-Ramos, *Francis Bacon’s Idea of Science*, 135–49.
79. Bacon, “Praefatio,” *Instauratio Magna*, WFB, 4: 20; *Advancement* II, WFB, 3: 443.
80. Bacon, *Valerius Terminus*, WFB, 3: 220. Cf. *Advancement* I, WFB, 3: 265.
81. Bacon, *Valerius Terminus*, WFB, 3: 221.
82. Bacon, *Confession of Faith*, WFB, 7: 224. Divine wisdom and order as pattern for the human natural philosophical endeavors is the theme of *Novum Organum* I.lxx, WFB, 4: 71 and *Advancement* I, WFB, 3: 300–301. For the doctrine of sacred history that is the context of these claims, see Matthews, *Theology and Science*, 41–50. For an interpretation of the mythical-Scriptural background to Bacon’s account of the constancy of matter, see Manzo, “Holy Writ.” For the relationship between these views and Calvinist doctrines, see the divergent interpretations in Milner, “Francis Bacon,” and Matthews, *Theology and Science*, 62–68, 71–77, 108–10.

83. Bacon, *Novum Organum* I.xli, *WFB*, 4: 54.
84. Bacon, "Praefatio," *Instauratio Magna*, *WFB*, 4: 18.
85. Bacon, *Novum Organum* I.x, I.xxiv, *WFB*, 4: 48, 51. See Rees, "Atomism and 'Subtlety,'" 567–71, for an analysis of Bacon's notion of "subtlety" and its key role in a cluster of ideas that also includes the notion of "dissecting" nature and thus of discovering its invisible "configurations" and latent "processes"—all central to his speculative (pneumatic) theory of matter.
86. Bacon, "Praefatio," *Instauratio Magna*, *WFB*, 4: 20.
87. Bacon, "Distributio Operis," *WFB*, 4: 23.
88. Bacon, "In Praise of Knowledge," *WFB*, 8: 125.
89. Bacon, "Distributio Operis," *WFB*, 4: 27.
90. Bacon, *Valerius Terminus*, *WFB*, 3: 222; *Novum Organum* I.cxxvi, I.cxxix, *WFB*, 4: 104, 115. See Harrison, *Fall of Man*, chap. 1.
91. Bacon, "Proemium," *Instauratio Magna*, *WFB*, 4: 7. Cf. "Of Truth," *Essays*, *WFB*, 6: 378.
92. Bacon, *Novum Organum* I.cxxiv, *WFB*, 4: 110. In *Valerius Terminus*, operation is seen as the very test of truth (*WFB*, 3: 242). See the discussion in Gaukorker, *Francis Bacon*, 155–59.
93. The necessity for human progress to come with labor, or with the "sweat of the brows," is a consequence of the Fall; such labor will be of "the working and discursion of spirits in the brain": *Valerius Terminus*, *WFB*, 3: 223.
94. *Ibid.*, 224; "Praefatio," *Instauratio Magna*, *WFB*, 4: 19, 21.
95. Bacon, *Advancement I*, *WFB*, 3: 294.
96. Bacon *Valerius Terminus*, *WFB*, 3: 232.
97. *Ibid.*, 235.
98. On Bacon's speculative system, see Rees, "Bacon's Speculative Philosophy." In "Unpublished Manuscript" and "Bacon's Philosophy," Rees argues that this system informs Bacon's program of natural historical inquiry. For the legacy of Bacon's methodology as divorced from the speculative system, see Henry, *Knowledge Is Power*, 66; Sargent, "Virtue," 73.
99. Bacon, *Advancement I*, *WFB*, 3: 294–95.
100. Bacon, *Temporis Partus Masculus*, in *Fundamental Texts*, 64, 68.
101. Bacon, *Cogitata et Visa*, in *ibid.*, 82.
102. Bacon, *Valerius Terminus*, *WFB*, 3: 224, 242.
103. On early modern notions of "experience," see Daston, "Baconian Facts"; Dear, "Meanings of Experience."
104. Bacon, *Redargutio*, in *Fundamental Texts*, 130; *Novum Organum* I.lxxiii, *WFB*, 4: 64–65.
105. Bacon, *Novum Organum* I.lxii–lxv, *WFB*, 4: 63–66.
106. Bacon, *Phaenomena Universi*, *WFB*, 5: 131.
107. Bacon, *Valerius Terminus*, *WFB*, 3: 250; *Redargutio*, in *Fundamental Texts*, 118–19; "Praefatio," *Instauratio Magna*, *WFB*, 4: 17; *Novum Organum* I.lxi, *WFB*, 4: 62–63.
108. Bacon, "Praefatio," *Instauratio Magna*, *WFB*, 4: 19.

109. Bacon, *Redargutio*, in *Fundamental Texts*, 119 (and note 1); *Novum Organum* I.civ, WFB, 4: 97.
110. Bacon, "Praefatio," *Novum Organum*, WFB, 4: 40.
111. Bacon, "Praefatio" and "Distributio Operis," *Instauratio Magna*, WFB, 4: 18, 23 (1: 130, 135). For a comparable reading of Bacon's "machine" image, see Zagorin, "Francis Bacon's Concept of Objectivity."
112. Bacon, *Novum Organum* I.xcv, WFB, 4: 92–93 Cf. also *Cogitata et Visa* and *Redargutio*, in *Fundamental Texts*, 97, 131.
113. Bacon, *De Augmentis* II, WFB, 4: 325 (1: 528). Quoted and discussed in Lewis, "Kind of Sagacity," 170–71.
114. Bacon, *De Augmentis* V, WFB, 4: 428.
115. *Ibid.*, 411–13. The "incompetency of the senses" did feature as one of the causes of the idols in the *Novum Organum* I.i, WFB, 4: 58. There, the help lay in instruments and wise experimentation; here, in better methods of reasoning. These are actually interrelated parts of the art of direction.
116. Bacon, *Parasceve*, WFB, 4: 251. Cf. "Distributio Operis," WFB, 4: 28.
117. He calls the former "narrative history," the latter, "inductive history": *De Augmentis* II, WFB, 4: 298.
118. *Ibid.*, 297–98. On the Proteus image and the relation art-nature, see Weeks, "Francis Bacon"; on Proteus and the conception of a decoding struggle that is expected to purify both nature and mind, see Pesic, "Wrestling with Proteus"; Briggs, *Francis Bacon*, chap. 1.
119. See Jalobeanu, "Fascination of Solomon's House," for an interpretation of the Baconianism of early modern English natural philosophy as indebted primarily to Bacon's natural histories rather than to his method of induction.
120. Bacon, *Parasceve*, WFB, 4: 261–62.
121. E.g., *Historia Densi et Rari, Historia Vitae et Mortis, Historia Ventorum*. Cf. Jalobeanu, "Natural History"; see also Manzo, "Probability," 126–27.
122. Bacon, *De Augmentis* V, WFB, 4: 413.
123. *Ibid.*, 423.
124. *Ibid.*, 420, 423 (1: 632, 635).
125. Bacon, *Novum Organum* II.xi–xiii, WFB, 4: 127–45; cf. the three types of tables exemplified in an analysis of the nature of heat, with an additional example of exclusion or rejection (147–48).
126. *Ibid.*, II.x, 127; *De Augmentis* V, WFB, 4: 435. See Lewis, "Kind of Sagacity," 171–72; Box, "Bacon's Moral Philosophy," 280.
127. Bacon, *Novum Organum* II.xix, WFB, 4: 149.
128. Bacon, "Distributio Operis," WFB, 4: 32.
129. Bacon, "Praefatio," *Novum Organum*, WFB, 4: 40.
130. Bacon, *Novum Organum* I.cxxvi, WFB, 4: 111–12. For Bacon's attitude to skepticism and probability, interpreted, contrary to the traditional view of Bacon, as a precursor to the mitigated skepticism of later English experimental philosophy, see Cohen, "Some Historical Remarks"; Manzo, "Probability."
131. Bacon, *Novum Organum* II.xix, WFB, 4: 246.

132. Ibid., II.xxxii, 173.
133. Bacon, *Advancement II*, WFB, 3: 387; *De Augmentis V*, WFB, 4: 410.
134. See Newman, *Promethean Ambitions*, 256–71; Weeks, “Francis Bacon”; Lewis, “Kind of Sagacity,” 169.
135. Bacon, *Novum Organum* I.cxxx, WFB, 4: 115.
136. Bacon, *Phaenomena Universi*, WFB, 5: 132.
137. Bacon, “Praefatio,” *Instauratio Magna*, WFB, 4: 18–19. It is relevant in this sense that Bacon accompanies the personal story of his own engagement with the interpretation of nature with a prayer—the marked sign of personal commitment (20).
138. Bacon, “Praefatio,” *Novum Organum*, WFB, 4: 43.
139. Bacon, *Temporis Partus Masculus*, *Redargutio*, in *Fundamental Texts*, 72, 107. For the “sons” of science or knowledge, see *Redargutio*, 104; “Praefatio,” *Novum Organum*, WFB, 4: 42; *De Augmentis VI*, WFB, 4: 449.
140. Bacon, *Valerius Terminus*, WFB, 3: 226–27; *Novum Organum* I.lxxxvi, WFB, 4: 85.
141. Bacon, *Cogitata et Visa*, in *Fundamental Texts*, 75; *Novum Organum* I.viii, I.lxxxvi, WFB, 4: 48, 85; *De Augmentis VI*, WFB, 4: 450–51. For Bacon’s doctrine of the communication of knowledge, with a discussion of the sources of the Baconian “brotherhood” of learning, see Jalobeanu, “Bacon’s Brotherhood.”
142. Bacon, *Temporis Partus Masculus*, *Redargutio*, in *Fundamental Texts*, 62, 126–27; “Praefatio,” *Instauratio Magna*, WFB, 4: 14; *Novum Organum* I.lxxiv, WFB, 4: 74–75.
143. See Jalobeanu, “Bacon’s Brotherhood.”
144. See Sargent, “Virtue.”
145. Bacon, *Advancement II*, WFB, 3: 432.

CHAPTER TWO

1. Burton, *Anatomy*, 109. See Gowland, “Problem of Early Modern Melancholy,” 117–20.
2. Wright, *Passions*, 13–14.
3. Burton, *Anatomy*, 109: “that so men might acknowledge their imperfections, and seeke to reforme what is amisse.”
4. Ibid., 22: the cure of melancholy is the task of both the divine and the physician; but “a good Divine either is or ought to be a good Physitian, a Spirituall Physitian at least.” On Burton’s combination of medical and moral philosophical advice, see Schmidt, *Melancholy*, 27–38.
5. Burton, *Anatomy* 2.3.1.1, 125.
6. Ibid., 1.2.3.1, 249.
7. Wright, *Passions*, 2–6.
8. See, e.g., *Charmides* 165a, d, *Alcibiades* 132c, *Gorgias* 464a–c, in *Complete Works*, 651–52, 591, 808.

9. Plato, *Phaedo* 107d, in *Complete Works*, 92.
10. Plato, *Republic* 585b, in *Complete Works*, 1193. Cf. *Timaeus* 90c: “constantly caring for this divine part as he does, keeping well-ordered the guiding spirit that lives within him, he must indeed be supremely happy” (*Complete Works*, 1289).
11. Plato, *Republic* 444d–e, 518d–e, in *Complete Works*, 1076, 1136. In the *Phaedo*, the “Platonic virtues” are said to be “with wisdom” and are described in terms of a “purging” of the passions (69b–c, in *Complete Works*, 60). On Plato’s dialogues as an investigation of *paideia*, see Rorty, “Plato’s Counsel”; on his use of medicine as a model for moral philosophy, see Moes, “Plato’s Conception.”
12. The early modern period saw a wealth of editions of these authors, a comprehensive survey of which is in Monsarrat, *Light from the Porch*, chap. 2. Besides Seneca, Cicero, and Plutarch, other sources of ancient philosophical thought included Marcus Aurelius’s *Meditations*, Epictetus’s *Manual*, Aulus Gellius’s *Attic Nights*, and Diogenes Laertius’s *Lives of the Philosophers*. For the early modern revival of the ancient philosophical schools, see also Kraye, “Moral Philosophy” and “Conceptions of Moral Philosophy”; Osler, *Atoms, Pneuma, and Tranquillity*; Strange and Zupko, *Stoicism*.
13. Cicero, *Tusculum* II.v, 101.
14. *Ibid.*, III.iii, 152. The Latin quotes are from *Tusculan Disputations*.
15. *Ibid.*, III.i, 149. Horowitz, *Seeds*, analyzes the epistemology related to the “seeds” and “sparks” metaphors in Stoic thought and traces their recuperation in medieval and early modern times.
16. Cicero, *Tusculum* III.iv, 153.
17. *Ibid.*, III.iv, 154 (*tranquillitate quadam constantiaque*), III.v, 154 (*sanitas animi*), IV.xv, 230 (*adfectio animi constans conveniensque*).
18. *Ibid.*, IV.ix, 224.
19. Passions consist of *opinio et iudicium* and of *voluntate*. *Ibid.*, III.xxv, 192, III.xxviii, 196. Cf. also Seneca, *On Anger*: anger is a “voluntary vice of the mind” that is formed starting from an “appearance” to which is added the mind’s “approbation” or “consent” (II.ii, *Workes*, 528–29). On the Stoic view of emotions as voluntary value judgments, with the consequent framing of therapy as rectification of opinion, see especially Sorabji, *Emotions and Peace of Mind*, parts 1 and 2.
20. Hadot, *Philosophy as a Way of Life*, 83.
21. *Ibid.*, 267.
22. Domański, *La philosophie*, 11.
23. Sellars, *Art of Living*, 46, 107. See also Nussbaum, *Therapy of Desire*; Foucault, *Hermeneutics of the Subject*; Pigeaud, *La maladie de l’âme*.
24. Cicero, *Tusculum* IV.iii, 213 (*amplissimam omnium artium, bene vivendi disciplinam*): an art expressed in the manner of life, rather than in written doctrine.
25. Hadot, *Philosophy as a Way of Life*, 128. See also Sellars, *Art of Living*, 112.
26. Hadot, *Philosophy as a Way of Life*, chap. 4. See also Domański, *La philosophie*, 25–29; Knuuttila, *Emotions*, chap. 2.

27. Augustine, *City of God* XXII.xxii, 7: 315.
28. Ibid., XIV.xi, 4: 325 (*mala vero voluntas prima*), XIV.xiii, 4: 337 (*inclinatus ad se ipsum*). To be turned toward oneself is the mark of the proud self-pleasers (*sibi placentis*) (339). For the aspects of the doctrine of the Fall emphasized in early modern Augustinianism, see Harrison, *Fall of Man*, chaps. 1 and 2.
29. Augustine, *City of God* XIV.xxviii, vol. 4.
30. Ibid., XIV.iii, 4: 271; XIV.v, 4: 283, 285.
31. Ibid., XIV.vi–ix, vol. 4.
32. Augustine, *Confessions* X.iv, 2: 81 (*pondere meo*); X.iii, 2: 77, 79 (*tu, medice meus intime*).
33. On the Augustinian cultivation of emotions, see Nussbaum, *Upheavals of Thought*, chap. 11. The way I have described it, this is one among several Augustinian legacies in the early modern period; for comments and bibliography, see Harrison, *Fall of Man*, 8. For a similar account of the two sources of the early modern care of souls, see Schmidt, *Melancholy*, chap. 1.
34. Bouwsma, “Two Faces of Humanism,” and Monsarrat, *Light from the Porch*, chap. 3, comment both on the incompatibility of the two anthropologies and on the early modern efforts at reconciling them. For the cross-fertilization of Calvinism and Roman Stoicism in late sixteenth- and early seventeenth-centuries social, educational, and ethical thought, see Todd, “Seneca and the Protestant Mind” and *Christian Humanism*; Strohm, “Ethics in Early Calvinism.”
35. Stroud, “Father Thomas Wright.”
36. On Renaissance psychology, based on the natural philosophical study of the soul in the wake of Aristotle’s *De anima* and *Parva naturalia*, but also indebted to the humanist discoveries of Neoplatonism, Stoicism, and skepticism, see Park and Kessler, “Concept of Psychology.” For the late scholastic and early modern psychologies, see Des Chene, *Life’s Form*; Vidal, *Les sciences de l’âme*.
37. Spellman, *John Locke*, 67.
38. Brown, *Descartes*, 30.
39. Reynolds, *Treatise*, 10–11: “For we commonly observe, that the Culture of the Minde, as of the Earth, doth many times deliver it from the barrenesse of its owne Nature.”
40. Sir John Davies, *Nosce Teipsum*; Davies of Hereford, *Microcosmos*. See also Rogers, *Anatomie*; Woolton, *Newe Anatomie*. For this literature, see Soellner, *Shakespeare’s Patterns*, 13–14, 19, 27.
41. Shuger, *Sacred Rhetoric*, 131. On the ethical function of Renaissance rhetoric, see Vickers, “Introduction” and “Philosophy and Humanistic Disciplines.” On Puritan eloquent preaching, see Morgan, *Godly Learning*, chap. 7. In *Holy Court*, Caussin draws on Coeffeteau’s scholastic account of the passions in *Humane Passions*, but adds a more voluminous practical part on the “manuring” of human nature (preface, n.p.).
42. Schmidt, *Melancholy*; Gowland, *Worlds of Renaissance Melancholy*.

43. See Schmidt, *Melancholy*, chaps. 3 and 4. Jalobeanu, “Experimental Philosophers,” 61, notes that Abernethy’s *Treatise* was grouped with Bacon’s *Advancement* in a list of representatives of the discipline of *medicina animorum* by Vincentius Placcius, a late seventeenth-century bibliophile and polymath, in his *De Morali Scientia* (1677). Hall emphasizes the Christian peace of mind in *Meditations and Vows*, a work known to Boyle. A similar approach is in Senault, *Use of Passions*; Ayloffe, *Government*.
44. Schmidt, *Melancholy*, 87–88, 90–92.
45. Patrick, *Hearts Ease*, 71–75.
46. Spurr, *Restoration Church*, especially chap. 6. For the Tew Circle and the Restoration Latitudinarians, see also Trevor-Roper, *Catholics, Anglicans, and Puritans*, chap. 4; Rivers, *Reason, Grace, and Sentiment*, chap. 2. For a discussion of the appropriateness of the term “Latitudinarian,” see Spurr, “‘Latitudinarianism.’”
47. For Bacon, see Matthews, *Theology and Science*, chap. 2; for Boyle, see M. Hunter, *Robert Boyle (1627–1691)*, chap. 4; Anstey, “Christian Virtuoso”; for Locke, see Spellman, *John Locke*; Marshall, “John Locke and Latitudinarianism”; Nuovo, “Introduction,” xviii–xxi. Nuovo comments on the “unofficial yet formative tradition” of Christian humanism informing Locke’s theology, which includes early Fathers and early modern religious thinkers, and which can be seen as “the product of the incorporation of Greek *paid-eia* into Christianity” (xviii). For the moderate Anglicans’ influence on the methodological thought of the English experimental philosophers, see B. Shapiro, *Probability and Certainty*, chap. 3; Henry, “Scientific Revolution.” In “Early Modern Intellectual Life,” Shapiro argues that this is ultimately an Erasmian inheritance.
48. M. Hunter comments on Boyle’s Christian-Stoic frame of mind in his early moral writings (*Boyle: Between God and Science*, chap. 4). Charron, Du Vair, and Lipsius feature among the titles in Locke’s library (Harrison and Laslett, *Library*, nos. 674, 1003d, 1763), as do Cicero, Plutarch, and Seneca (nos. 711–21, 2356–58, 2612). See also Nuovo, “Aspects of Stoicism,” for an inventory of the Stoic sources available to Locke (3) and for a discussion of Stoic themes in Locke’s work.
49. See Levi, *French Moralists*; Monsarrat, *Light from the Porch*; Miller, *Peiresc’s Europe*; Baldwin, “Individual and Self.”
50. Epictetus’s *Manual* was usually printed together with Simplicius’s Neoplatonist commentary (cf. Levi, *French Moralists*, 85) and had been used as a “handbook for monastic asceticism” by the early Fathers (cf. Monsarrat, *Light from the Porch*, 51).
51. Du Vair, *Morall Philosophy*: “Philosophy our Physitian” (15), God our “Physitian” (89). In his later *Buckler against Adversitie*, Du Vair insists on the pious Christian’s total dependence on God.
52. Lipsius, *Manuductio* II.vii, *Physiologia* III.iii, quoted in Lagrée, *Juste Lipse*, 38, 72.

53. Charron, *Of Wisdome*, 425.
54. Charron, *Of Wisdome*, 285; Du Vair, *Morall Philosophy*, 91; Lipsius, *Of Constancie* II.iv, 69. Cf. also Augustine, *City of God* X.iii, 3: 261: the inward service to God involves a turning of the whole inner man into a sacrificial *templum*.
55. See M. Hunter, *Boyle: Between God and Science*, 97. At some point Boyle asked Du Moulin to give an English translation of François Perraud's *Devil of Mascon* (1658). In their exchange, Boyle calls him "my reverend and learned friend" and apologizes for requesting a work of mere translation from someone who has proven to be able to "write excellent [works] of his own" (Boyle, *WRB*, 1: 14–16). It is possible that Du Moulin's consolation tract was among those "excellent works" that Boyle knew.
56. Cf. Casaubon, *Letter*: Du Moulin had recommended Glanvill's manifesto of virtuosio philosophy, *Plus Ultra*, but Casaubon, a defender of traditional learning, was not convinced.
57. E.g. Sidney, *Defence*, 347–48: "well-doing" rather than simply "well-knowing" is the end of learning, and it consists in a "perfection [of] our degenerate souls," achieved by "purifying of wit, enriching of memory, enabling of judgment, and enlarging of conceit." Poetry serves the end of learning thus defined. On rhetorical "utility" against scholastic "sterility" in the humanist polemics, see Vickers, "Philosophy and Humanistic Disciplines."
58. Flacius, *Clavis scripturae sacrae*, quoted in Shuger, *Sacred Rhetoric*, 132. On similar conceptions in Erasmus, see Herdt, *Putting on Virtue*, chap. 4.
59. Morgan, *Godly Learning*, 71.
60. *Ibid.*, 69–70, 76–77. Morgan (65–66) also notes the influential appearance of the notion of "curious speculation" in the glosses to the Puritan Geneva Bible, esp. to 1 Corinthians 3:15, and the Tomson Geneva gloss to Colossians 2:8. Harrison, "Experimental Religion," has an illuminating discussion on the use of the "speculative" versus "experimental" contrast (which subsumes the "utility" question) in early modern religious discourse—a contrast that, the author suggests, may have influenced the use of the same dichotomy in natural philosophical discourse. On the latter, see Anstey, "Experimental versus Speculative Natural Philosophy." I thank Peter Harrison for allowing me to read his article in advance of publication.
61. Quoted in Spurr, *Restoration Church*, 281.
62. *Ibid.*, 284, 304.
63. Cicero, *Tusculum* I.i, 1.
64. *Ibid.*, II.iv, 99–100.
65. Lipsius, *Of Constancie* II.iv, 68–69.
66. Charron, *Of Wisdome*, preface, n.p.
67. *Ibid.*, 216, 473, 467.
68. This division is of course different from Aristotle's division of knowledge into theoretical, practical, and productive. But echoes of the sense of "practical" as knowledge turned into a guide to right living did feature within

- medieval Aristotelian classifications of knowledge: see Evans, *Philosophy and Theology*, 125–26, note 12. Kelley, “Problem of Knowledge,” usefully comments on the meanings of “discipline” in the early modern period, which included both the sense of a branch of knowledge, and that of pedagogical *mathesis*, understood as working toward the perfecting of the intellect through well-directed instruction.
69. Subtitle of the first part of Boyle’s *Usefulness of Experimental Natural Philosophy* (1663).
 70. Charron, *Of Wisdome*, 58–59.
 71. *Ibid.*, 59, 64.
 72. *Ibid.*, 65, 229.
 73. *Ibid.*, 157–60.
 74. *Ibid.*, 229–30.
 75. *Ibid.*, preface, n.p.: the soul that lacks “culture and instruction.”
 76. Plato, *Laws* V, 731d–e *Complete Works*, 1414: the love of self is called “the most serious vice innate in most men’s souls,” since it is “a love which blinds us to the faults of the beloved and makes us bad judges of goodness and beauty and justice.” Aristotle, *NE* IX.8, 1168b15–1169a15: the bad or vicious person should not be a self-lover since thus “he will harm both himself and those around him through following worthless attractions.” Both sources are cited by Wright, *Passions*, 14.
 77. Wright, *Passions*, 345.
 78. *Ibid.*, 77–81. Wright’s exercises include bending the inclinations to the other extreme; moderation; fleeing the occasion; playing one passion against another; resisting the beginning of the passion; mortifying the body; daily examination of conscience.
 79. Du Moulin, *Peace and Contentment*, 170–171.
 80. *Ibid.*, 265.
 81. *Ibid.*, 341.
 82. *Ibid.*, 332.
 83. Mornay’s “ecumenical, moderate, cosmopolitan Christianity” and its impact on Sidney are discussed in Stillman, *Philip Sidney*, 125–40. Sidney began a translation of *De la vérité* but never finished it. A first complete translation was due to Arthur Golding in 1587. Boyle listed Mornay’s *De la vérité* together with Vives’s and Grotius’s works of the same title in his “Introduction to my loose notes theological.” See a reproduction of this list, together with commentaries, in Anstey, “Christian Virtuoso.” The work also features in Locke’s library catalogue (Harrison and Laslett, *Library*, no. 2054b).
 84. Mornay, *De la vérité*: “asservir la raison par raison à la foy.” Reason’s role is to discover its own limits, to let itself become illuminated by the revealed truth, and to ascertain the credibility of revelation (Préface au lecteur, n.p.).
 85. *Ibid.*, 297–302.
 86. *Ibid.*, 308.

87. Ibid., 332–35, 347. Stillman comments on the inadequacy of grouping Mornay with the strict Calvinists, despite his theology of the Fall (*Philip Sidney*, 136–37, 142). The cooperation of “natural light and saving Word” is a tenet that Mornay rather shares with Melancthon and the “Philippists” (146–54).
88. Reynolds, *Treatise*, 457–58.
89. Ibid., preface, n.p.
90. Ibid., 2–3. The quoted phrase is a variant of Seneca’s words in *De beneficiis* VI.xxiii (*Workes*, 127).
91. Reynolds, *Treatise*, 429–30, 437–40.
92. I borrow the phrase from Spurr, *Restoration Church*, 324.
93. On Jansenist “inscrutability” of self and of the operation of grace, see Moriarty, *Fallen Nature*, chaps. 6 and 10. On Jansenist “self-love” as concupiscence radically opposed to the love of God, see *ibid.*, chap. 3, and Levi, *French Moralists*, 225–33. On Luther’s, Pascal’s and Nicole’s views on human agency with reference to their reaction against (Aristotelian) habituation and virtue, see Herdt, *Putting on Virtue*, chap. 6 and 235–461. On the Restoration Anglican divines’ conception of a “husbandry” of the soul, both human and spiritual, see Spurr, *Restoration Church*, 281–311. Against the “utilitarian” reading of Anglican ethics, Spurr emphasizes the serious theological load of their piety and the severe ascetics it presupposed (310).
94. Lipsius, *Of Constancie* I.vi, 9–10.
95. Charron, *Of Wisdome*, 67–68.
96. Lipsius, *Of Constancie* I.v, 11.
97. See the commentary in Lagrée, *Juste Lipse*, 102–3, 119.
98. Charron, *Of Wisdome*, 227; Du Vair, *Morall Philosophy*, 4.
99. Cicero, *Tusculum* IV.xv, 230.
100. Ibid., III.iv, 154, IV.xxxvii, 262.
101. Ibid., III.viii, 160–61.
102. Lipsius, *Of Constancie* I.iv, 9.
103. Lagrée, “Constancy and Coherence,” 150, 151. The case of “prudence” (cf. Du Vair or Charron) is interesting: it is sometimes meant as an equivalent of the Stoic disposition of a healthy mind but does not lose the Aristotelian-Thomistic echoes of *phronēsis-prudentia*. On prudence with this double reference, see Lories, *Le sens commun*, chaps. 2 and 6.
104. The term has a long history, and in one important development, following Saint Augustine, assent becomes the operation of the (separate) faculty of the will. This development leads to a medieval tradition of making degrees of sin dependent on degrees and stages of assent. See Knuuttila, *Emotions*, chap. 3.
105. Cicero, *Tusculum* IV.vii, 220.
106. Ibid. IV.xxxvii, 262.
107. Galen, *Passions and Errors* I.ii.2, I.ii.6, in *Selected Works*, 129, 145.
108. Ibid., I.ii.6, 146.

109. On Stoic assent as part of a theory of knowledge and opinion, see Long and Sedley, *Hellenistic Philosophers*, 253–59; Frede, “Stoic Epistemology”; and as part of the psychology of action, Sorabji, *Emotions and Peace of Mind*, 61–72.
110. The early Stoic notion of assent (*sunkatathesis*) informs the terms of the later Stoics’ accounts of the discipline of the mind as well. According to Inwood, Epictetus’s *prohairesis* and Seneca’s *iudicium* are both “a form of assent and a stable disposition that constitutes the locus of happiness” (“Moral Judgment,” 90).
111. Wright, *Passions*, 52.
112. *Ibid.*, 294–95.
113. *Ibid.*, 295–97.
114. *Ibid.*, 300–311.
115. *Ibid.*, 298.
116. *Ibid.*, 312.
117. *Ibid.*, 317–18.
118. Reynolds, *Treatise*, 64–68.
119. *Ibid.*, 463–64, 466.
120. *Ibid.*, 483–95.
121. John Yolton and Jean Yolton, “Introduction,” 10–11.
122. Walker, *Of Education*, 71–96.
123. *Ibid.*, 173–91.
124. E.g., in Sancto Paulo’s *Compendium*, widely used as a textbook in the first half of the seventeenth century. In the first part (dedicated to dialectic or logic), the author defines judgment as the operation by which the mind either assents to or dissents from apprehensions (71).
125. Nicole’s “Of the weakness of man” was one of the three essays Locke translated into English in 1675–77. See Locke, *Locke as Translator*, essay 2, especially chap. 2. For a Locke-Nicole parallel, see Marshall, *John Locke*, 131–38. But, as will be seen in chapter 5 below, Locke himself did not think that the function of self-knowledge terminates in humiliation.
126. Cicero, *Tusculum* III.iii, 152.
127. *Ibid.*
128. *Ibid.*, IV.xxvii, 248.
129. On the Socratic figure as emblematic of the idea of philosophy as an art of living, see Hadot, *Philosophy as a Way of Life*, chap. 5; Nehamas, *Art of Living*, chaps. 1–3.
130. Galen, *Passions and Errors* I.i.10, in *Selected Works*, 125–26
131. Wright, *Passions*, 79–80, 95.
132. Morford, *Stoics and Neostoics*, chap. 2.
133. Walker, *Of Education*, 25–29 (the virtues of the educator), 93 (the educator as a “Physitian”), 189 (the educator as “faithfull monitor”); Locke, *STE* §§76, 78, 90, 93, 94, 100 (the tutor’s virtues), 101, 102 (the tutor’s task of discriminating the peculiar “complexion” of each individual child’s mind).
134. Wright, *Passions*, 79, 89.

135. Galen, *Passions and Errors* I.ii.6, in *Selected Works*, 145–46.
136. Wright, *Passions*, 94, 99.
137. Reynolds, *Treatise*, 481.
138. Bacon, *Advancement I*, WFB, 3: 293.
139. On Stoic and the two varieties of skeptic assent, see Long and Sedley, *Hellenistic Philosophers*, 236–66, 438–66; Frede, *Essays*, chaps. 9–11.
140. Charron, *Of Wisdome*, 227, 230–31.
141. *Ibid.*, 231, 238. See also the importance of “study” as a guide to wisdom for Lipsius, preface to *Of Constancie*, and Lagrée’s comment (*Juste Lipse*, 115–16).
142. Reynolds, *Treatise*, 50.
143. Walker, *Of Education*, 190.
144. Du Moulin, *Peace and Contentment*, 181.
145. *Ibid.*, 184.
146. *Ibid.*, 341–42.
147. Charron, *Of Wisdome*, 230, 231.
148. Walker, *Of Education*, 187–88.
149. Aristotle, *NE* II.1, 1103a15–20. For Aquinas’s understanding of the relation between the intellectual and the moral virtues, see *ST* IaIIae, q. 58. On the variety of Renaissance positions relative to this issue, see Kraye, “Moral Philosophy,” 333–39.
150. Cicero, *Tusculum* IV.ix, 223.
151. Galen, *Passions and Errors* I.i.5, in *Selected Works*, 111.
152. *Ibid.*, I.ii.6, 145.
153. Sellars, *Art of Living*, 121, 119. Note 53 at 119 explains the meaning of “habituation” as related etymologically both to “habit” or “custom” (*ethos*) and to “character” (*ēthos*). Sellars also notes that habituation should be understood “not as an unthinking habit but rather as a conscious learning process.”
154. *Ibid.*, 120–22. Sellars quotes Marcus Aurelius on “dyeing,” Epictetus and Seneca on “digestion.” The metaphors make perfect sense within the framework of the early Stoic conception of a material soul: the transformation wrought in the soul by its judgments is at the same time a transformation of the “tension” (*tonos*) of the *pneuma* of the rational soul (*ibid.*, 125–26).
155. Charron, *Of Wisdome*, preface and 264.
156. Principe, *Aspiring Adept*, 83. Principe demonstrates Boyle’s familiarity with the practice and vocabulary of alchemy. “Tincture” with these connotations features in his *Sceptical Chymist*, WRB, 2: 280; *Origin of Forms and Qualities*, WRB, 5: 420–21. Bacon, too, used “tincture” in the context of discussing the transmutation of metals (and specifically the making of gold), e.g., *Sylva Sylvarum*, experiment 328, WFB, 2: 450; *Physiological remains*, “Questions touching minerals,” WFB, 3: 813.
157. Plutarch, “Of Meekenes, or How a man should refraine choler,” *Morals*, 119. The moral life is a matter of imprinting *ethos* on the soul by exercise

- and “long continuance of time” (“Of Moral Vertue,” 65–67). Walker, *Of Education*, 190: good counsel will work “not as Physick, but as nourishment,” which is to say, it has to be “continually received, ruminated and digested.”
158. Cf. the “transformation” of the self in Lipsius, *Of Constancie* I.iii, 7; the self “transfigured and reformed” in Seneca, Ep. VI, *Workes*, 169; the idea of “becoming another man” in Ep. CIV, 433.
 159. See Seneca, Ep. LXXV, on “ascending by degrees” to a healthy mind, speaking of three groups/stages of those who are “proficient” (*Workes*, 306–7).
 160. Critiques of the Royal Society virtuosi appeared early on, especially on account of the futility, the irreligion, or even the “enthusiasm” of their endeavors; see Spiller, *Casaubon and the Royal Society*, chap. 2; Heyd, “*Be Sober and Reasonable*,” chap. 5. Casaubon’s *Letter* is especially relevant here: the association of anatomical dissection and religious morality—of which Casaubon learns from Peiresc’s life narrated by Gassendi in *Mirrou*—appears to him patently absurd and in no position to replace the primer of moral philosophy, Aristotle’s *Nicomachean Ethics*.

CHAPTER THREE

1. Charleton, *Immortality*, 42. See Booth, “*Subtle and Mysterious Machine*,” 22–24. The tide turned for Charleton and after the Restoration he became one of the first fellows of the Royal Society in 1662 and later a fellow of the College of Physicians in 1676.
2. Charleton, *Immortality*, 12–13.
3. See Sarasohn, *Gassendi’s Ethics*, 171; Osler, *Divine Will*, 77. The chapter on Epicurus in Stanley’s *History of Philosophy* also closely follows Gassendi.
4. Booth, “*Subtle and Mysterious Machine*,” 54. On the Epicurean revival in the sixteenth and seventeenth centuries, see Kraye, “Moral Philosophy”; Joy, “Epicureanism”; Osler, *Atoms, Pneuma, and Tranquillity* and “Early Modern Uses of Hellenistic Philosophy”; Wilson, *Epicureanism*.
5. The first book of Gassendi’s *Syntagma Philosophicum*, included in his *Opera Omnia* (1658); cf. Bernier, *Abrégé*, vol. 1, “De la Philosophie en general.”
6. Sprat, *History*, part 3, title of section 13.
7. *Ibid.*, 341–42. A paean to the pleasures of the study of nature follows at 343, recalling Bacon’s defense of the pleasures of learning modeled on Lucretius’s *De rerum natura* (*Advancement* I, WFB, 3: 317–18).
8. Boyle, *Excellency of Theology*, WRB, 8: 48.
9. Charleton, *Immortality*, 15.
10. *Ibid.*, 16.
11. Glanvill, *Plus Ultra*, 7; “Anti-fanatical Religion,” *Essays*, 6, 11.
12. Sprat, *History*, 32–34.
13. Charleton, *Immortality*, 18.
14. Tellingly, the divines that rescued Bensalem from the wars of enthusiasm had been inspired by the works of such early modern promoters of

- “rational religion” as Henry Hammond, Jeremy Taylor, and Hugo Grotius: Glanvill, “Anti-fanatical Religion,” *Essays*, 6.
15. *Ibid.*, 14.
 16. *Ibid.*, 13; the discussion of human nature is at 11.
 17. *Ibid.*, 25. Cf. also *Philosophia Pia*: “plain Christianity” is “an imitation of Christ in *Charity, Humility, Justice, and Purity*; in the exercise of all virtue, and command of our selves” (66).
 18. Glanvill, “Anti-fanatical Religion,” *Essays*, 51.
 19. *Ibid.*, 54. Bacon had found a similar use for mathematics (“Of Studies,” *Essays*, *WFB*, 6: 498). See Gaukroger, *Francis Bacon*, 25–27.
 20. Glanvill, “Anti-fanatical Religion,” *Essays*, 47.
 21. *Ibid.*, 48.
 22. *Ibid.*, 49, 50–51. For the “camps” of the Cartesians and the Gassendists in the seventeenth century, see Lennon, *Battle of Gods and Giants*.
 23. Sprat, *History*, 82.
 24. Charleton, *Natural History*, Epistle Prefatory, n.p.
 25. On Boyle’s appreciation in the late 1650s of Descartes’s *Passions* both for its challenge to Aristotelianism and for its consolatory moral purpose, see M. Hunter, *Boyle: Between God and Science*, 106. Locke read the *Meditations* and the *Passions* in the very early 1660s: Milton, “Locke at Oxford,” 15.
 26. Descartes, *Meditations* IV, CSM, 2: 39–40; AT, 9a: 45–46.
 27. Menn, *Descartes and Augustine*, chap. 7; Janowski, *Cartesian Theodicy*, chap. 4.
 28. Descartes, *Passions* I.27–28, 45, CSM, 1: 338–39, 345; AT, 11: 349, 362.
 29. Charleton, *Natural History*, Epistle Prefatory, n.p.
 30. *Ibid.*, 172.
 31. *Ibid.*, 181.
 32. *Ibid.*, 175–86.
 33. Descartes, *Meditations* IV, CSM, 2: 40–41; AT, 9a: 46–47. The liberty of indifference versus the liberty of spontaneity were terms of a debate over the freedom of the will between the Jesuits and the Oratorians; see Caton, “Will and Reason,” 94; Sarasohn, *Gassendi’s Ethics*, chap. 4.
 34. Descartes, *Meditations* IV, CSM, 2: 42; AT, 9a: 48.
 35. *Ibid.*, CSM, 2: 42–43; AT, 9a: 49. See Menn, *Descartes and Augustine*, 321. For Charleton, the Cartesian “art of rectifying the will” by suspension of assent must be supplemented by a (non-Cartesian) invocation of divine assistance: *Darknes of Atheism*, 276–77.
 36. Descartes, *Passions* III.152–53, CSM, 1: 384; AT, 9: 445–46.
 37. *Ibid.*, I.48, CSM, 1: 347; AT, 11: 367.
 38. *Ibid.*, III.211, CSM, 1: 403; AT, 11: 486.
 39. *Ibid.*, III.161, CSM, 1: 387; AT, 11: 453. On the mechanism and significance of rehabilitation in Descartes’s theory of the passions from the point of view of a moral psychology, see Williston, “*Akrasia* and the Passions,” 51–54, and from the point of view of a “machine psychology,” Hatfield, “*Passions of the Soul*,” 21–28. For the relevance of the Cartesian discipline of

- the passions to the Meditator's progress in the *Meditations*, see L. Shapiro, "Cartesian Generosity" and "What Are the Passions Doing in the *Meditations*?"; Brown, *Descartes*, chap. 6. Pereboom, "Stoic Psychotherapy," analyzes the relevance of the Stoic theory of assent to the "psychotherapy" of Descartes's *Passions* and *Meditations*.
40. Charleton himself explained the "liberty of election" in his earlier *Darknes of Atheism* as the act of assent of the rational faculty, which is only subsequently followed by the will. He signals the Stoic framing of his account of assent by quoting the Greek technical term *sunkatathesis* (260–62). Assent or judgment as an operation of the intellect is also a Thomistic doctrine: Menn, *Descartes and Augustine*, 309–10; Janowski, *Cartesian Theodicy*, 123.
 41. Menn argues that although Descartes does not explicitly place his view of the human propensity to error in an Augustinian framework, since he avoids theology, he nevertheless "adopts Augustine's view of the results [of original sin], and uses it to describe the disease he is intending to cure" (*Descartes and Augustine*, 318). Even on this view, though, the difference in emphasis and in the complexity of the charts of distempers between Descartes's account and that in the treatises of the passions of the "Augustinian-Socratic" sort is conspicuous.
 42. Arnauld and Nicole, *Logic* III.xx, 338 (*Logique*, 237).
 43. *Ibid.*, 341 (*Logique*, 239).
 44. *Ibid.*, 339 (*Logique*, 237).
 45. *Ibid.*, 340–78 (*Logique*, 237–64).
 46. Malebranche, *Recherche* I.1, 1. Locke purchased the *Logique* and Malebranche's *Recherche* among other logical works during his French travels: Milton, "Locke, Medicine and Mechanical Philosophy," 302.
 47. Michael, "Why Logic Became Epistemology."
 48. Gassendi, *Institutio Logica*, canons 11–14 of part 1 (on "apprehension" or ideas) and canon 21 of part 3 (on "inference" or syllogism), 93–96, 152–55 (and 12–15, 67–69 for the Latin version).
 49. Arnauld and Nicole, *Logic*, 2–3 (*Logique*, 3–4).
 50. *Ibid.*, 8 (*Logique*, 7).
 51. Cf. Gaukroger, *Cartesian Logic*, 34–47; Buickerood, "Natural History of the Understanding"; Nuchelmans, "Logic," 105–7; Schuurman, *Ideas, Mental Faculties and Method*, 11–15. For Keckermann's and Alsted's conception of logic as an art of healing the mind of postlapsarian corruption, see Hotson, *Alsted*, 66–73.
 52. Descartes, *Discourse* II, CSM, 1: 119–20; AT, 6: 18–19.
 53. Garber, "Descartes, or the Cultivation of the Intellect," 130. This is a development of Descartes's *Rules for the Direction of the Mind*, and the notion of a new logic thus understood reappears in the preface to the French edition of the *Principles of Philosophy*. On Cartesian logic, see also Gaukroger, *Cartesian Logic*.
 54. Descartes, *Discourse* II, CSM, 1: 120–1; AT, 6: 19, 21.

55. Besides the already cited literature, see also Hatfield, “Cognitive Faculties,” 965–68; Dawson, *Locke*, 21–23.
56. The *Vanity of Dogmatizing* knew two more variants in the following years: the *Scepsis Scientifica* (1665) and the essay “Against Confidence in Philosophizing” included in his *Essays* (1676). Bacon’s idols and Browne’s analysis of the “sources of common errors” in *Pseudodoxia* are among Glanvill’s explicit debts relevant here.
57. Glanvill, *Vanity*, 62–63.
58. *Ibid.*, 92, 93. Glanvill produces an Epicurean defense of the senses in the manner of Gassendi, on which see LoLordo, *Pierre Gassendi*, 61 and chap. 3.
59. Glanvill, *Vanity*, 70. This is an explicit debt to Descartes’s depiction of the errors imbibed in early childhood in the first part of the *Discourse* and of the *Principles*.
60. Glanvill, *Vanity*, 104. This is an explicit debt to More’s *Enthusiasmus Triumphatus*. On More’s account of the imagination as serving his attack on enthusiasm, see Vermeir, “Imagination.”
61. Glanvill, *Vanity*, 106–7.
62. On Descartes’s debt for the first rule of his method in *Discourse II* to “precipitation” (*apoptōsia*, *propeteia*)—a technical term related to the Stoic notion of assent, see Hadot, *What Is Ancient Philosophy?* 265.
63. Glanvill, *Vanity*, 107.
64. *Ibid.*, 113.
65. Charleton, *Physiologia*, 6, 7.
66. Glanvill, *Vanity*, 119–20.
67. *Ibid.*, 193–94. The reference is to Bacon, *Novum Organum* I.xli, *WFB*, 4: 54.
68. Arnauld and Nicole, *Logic*, 5–6 (*Logique*, 5–6).
69. Sprat, *History*, 103. Similarly, Sprat describes the process of “conjecturing on causes” as a passionate, greedy “hunt” for a treasure, which fails not really by missing some logical or methodological step but owing to the propensity of “catching at it too soon, with too greedy, and rash a hand” (101).
70. Glanvill, *Vanity*, 120.
71. *Ibid.*, 135.
72. *Ibid.*, 136.
73. Hooke, *General Scheme*, 7. The list of imperfections follows at 8–10.
74. Glanvill, *Vanity*, 15.
75. Glanvill, “Against Confidence in Philosophizing,” *Essays*, 30.
76. Arnauld and Nicole, *Logic*, 6–7 (*Logique*, 6).
77. Arnauld and Nicole, *Logic*, 8–10 (*Logique*, 7).
78. Sprat, *History*, 101.
79. *Ibid.*, 106.
80. *Ibid.*
81. Van Leeuwen, *Problem of Certainty*; Osler, “John Locke and the Changing Ideal”; Hacking, *Emergence of Probability*; B. Shapiro, *Probability and Cer-*

- tainty; Patey, *Probability*; Henry, “Scientific Revolution”; Daston, “Probability and Evidence”; Serjeantson, “Testimony and Proof”; Franklin, *Science of Conjecture*; Popkin, *History of Scepticism*.
82. Popkin, *History of Scepticism*, 15.
 83. Ibid., 112. But see Ayers, “Theories of Knowledge and Belief,” who argues that the new philosophers’ epistemological positions can be seen as following two lines of criticisms against the Aristotelian account of the progress from observation to science (1003–8).
 84. B. Shapiro, *Probability and Certainty*, 64–65. Cf. also Van Leeuwen, *Problem of Certainty*; Henry, “Scientific Revolution”; Franklin, *Science of Conjecture*.
 85. Shapin, *Social History of Truth*, 118 and chap. 3.
 86. Harrison, *Fall of Man*, 6. The three types of methods are distinguished by their respective emphases on experiment, theoretical reason, and divine inspiration as grounds of knowledge.
 87. Ibid., 50–51, 138. For a critique of Popkin’s thesis from this perspective, see 84–88. Harrison seems more inclined toward the idea of inner reformation in his earlier “Original Sin.”
 88. For analyses of English antidogmatism from the cultural-social perspective on the problem of knowledge, see, e.g., B. Shapiro, *Probability and Certainty*, 17; Shapin and Schaffer, *Leviathan and the Air-Pump*, 24, 136; Shapin, *Social History of Truth*, 117, 335.
 89. Glanvill, *Vanity*, 225–34.
 90. Glanvill, “Of Scepticism and Certainty,” *Essays*, 51.
 91. Ibid.
 92. Ibid., 44.
 93. Osler, *Divine Will*, chap. 4; LoLordo, *Pierre Gassendi*, chap. 3.
 94. Descartes, *Principles* IV.204–6, CSM, 1: 289–90; AT, 9b: 322–24.
 95. Ariew, “Cartesian Empiricism” and “New Matter Theory.” See also Laudan, *Science and Hypothesis*, chap. 4; Garber, *Descartes Embodied*, chap. 6.
 96. Descartes to Elizabeth, 28 June 1643, CSMK, 228; AT, 3: 695.
 97. Wilkins, *Principles and Duties*, 7–8.
 98. Wilkins, *New World*, 18.
 99. Glanvill, *Vanity*, 108–9.
 100. Ibid., 64–66.
 101. Ibid., 64.
 102. “Opinion” featured in the late scholastic discussions of the forms of knowledge (science, opinion, and faith). Opinion was obtained by probable reasoning, in contrast with certainty (which came in three degrees: metaphysical, physical, and moral). See Ariew, “New Matter Theory,” discussing Roderigo Arriaga’s *Cursus Philosophicus* (1632). Opinion had thus the lowest epistemic status, which it also preserved for Wilkins or Glanvill. But the reference to the state of the mind associated with opinion is a distinct matter, specific to the *cultura animi* context. Locke will also use “opinion” both as a neutral equivalent of “belief” (as distinct from certain knowledge)

- and in the sense of the harvest of an untrained mind; for the latter sense, see *Conduct* §34, 107: “I am not enquiring the easy way to Opinion, but the right way to Truth; which they must follow who will deal fairly with their own Understandings and their own Souls.”
103. Glanvill, “Against Confidence in Philosophizing,” *Essays*, 28–29.
 104. Thus, e.g., Glanvill: “Thus, then, to the *knowledge* of the most contemptible *effect* in nature, ’tis necessary to know the whole *Syntax* of Causes, and their particular *circumstances*, and *modes* of action. . . . So then, every Science borrows from all the rest; and we cannot attain any single one, without the *Encyclopaedy*” (*Vanity*, 217–28). Cf. also Sprat, *History*, 110.
 105. Glanvill, “Of Scepticism and Certainty,” *Essays*, 42–44.
 106. *Ibid.*, 46.
 107. Glanvill, *Vanity*, 229.
 108. Sprat, *History*, 107.
 109. *Ibid.*, 116; “questions and directions” at 155.
 110. *Ibid.*, 32, 33.
 111. Anstey, “Experimental versus Speculative Natural Philosophy.” Sprat, for instance, sets in opposition “the formal” (the speculative philosophers), “the prudent” (the experimental philosophers), and “the crafty” (the empirical philosophers) (*History*, 340).
 112. Sprat, *History*, 340, 341.
 113. Mulligan, “Robert Hooke’s ‘Memoranda’” and “Self-Scrutiny.”
 114. Hooke, *General Scheme*, 9–10.
 115. *Ibid.*, 11.
 116. *Ibid.*, 5. On Hooke’s method and Baconian legacy, as well as on his general profile as a natural philosopher, see M. Hunter, “Hooke the Natural Philosopher.”
 117. Hooke, *General Scheme*, 20.
 118. *Ibid.*, 19.
 119. Charleton, *Immortality*, 16.
 120. Wilkins, *New Planet*, 23. Chillingworth tells us that this notion is due to Epictetus: “And he that is otherwise affected, and has not a Travellers indifferencie, which Epictetus requires in all that would find the truth, but much desires in respect of his ease, or pleasure, or profit, or advancement, or satisfaction of friends, or any human consideration, that one way should be true rather than another; it is odds but he will take his desire that it should be so, for an assurance that it is so” (*Religion of Protestants*, 2). Cf. also Gassendi, *Institutio Logica*, canon 12 of part 1, 94 and 13: prejudices need to be eradicated and the mind kept “free and neutral [*indifferens ac libera*] in examining and determining what idea it will hold to be true.”
 121. Glanvill, *Vanity*, 15.
 122. Shapin and Schaffer, *Leviathan and the Air-Pump*; Dear, “*Totius in verba*” and *Discipline and Experience*; Daston, “Baconian Facts”; B. Shapiro, *Culture of Fact*; Pomata and Siraisi, *Historia*.

123. Shapin and Schaffer, *Leviathan and the Air-Pump*, 22–25, 69, 77–78, chap. 8, and passim. On a similar conception in Gassendi and in the project of the Paris Académie royale des sciences (founded 1666), see Joy, *Gassendi the Atomist*, 210–11.
124. Hooke, *General Scheme*, 10.
125. Sprat, *History*, 85.
126. Ibid., 96.
127. Hooke, *General Scheme*, 19. Cf. Bacon, *Parasceve*: the review of received opinions is a way to “touch and rouse the intellect and no more,” and it requires a mind capable of freedom from imposition and credulity (*WFB*, 4: 262).
128. Sprat, *History*, 97.
129. Ibid., 98, 99. Bacon’s remark is in *Sylva Sylvarum*, experiment 988, *WFB*, 2: 667–68.
130. Sprat, *History*, 102.
131. Garber, *Descartes Embodied*, chap. 14.
132. On the Baconian methodology of the Early Royal Society, see Hunter and Wood, “Towards Solomon’s House”; Lynch, *Solomon’s Child*, chap. 1.
133. Daston, “Objectivity,” “Baconian Facts,” “Moral Economy of Science”; Daston and Galison, “Image of Objectivity” and *Objectivity*.
134. Daston, “Moral Economy of Science.”
135. Shapin, *Scientific Life*, 1; see also Porter, *Trust in Numbers*.
136. Explicit or implicit theses about personal knowledge are in Daston, “Objectivity”; Zagorin, “Francis Bacon’s Concept of Objectivity”; and of impersonal knowledge in Dear, “From Truth to Disinterestedness”; Solomon, *Objectivity in the Making*; B. Shapiro, *Culture of Fact*. Cf. the apparent wavering in Gaukroger, *Emergence of a Scientific Culture*, between statements in favor of and against the relevance of the character of the observer to the notion of objectivity: at 245, impartiality and lack of bias are features stemming from “a concern with the character of the natural philosopher”; but at 243, objective inquiry is such that it “does not depend upon any features of the particular subject who studies it.”
137. B. Shapiro, *Culture of Fact*, 132; Gaukroger, *Emergence of a Scientific Culture*, 244.
138. Saunders, “Judicial Persona,” 140, 143.
139. See Shapin, *Scientific Life*, 15, 22–23.
140. Daston and Galison, *Objectivity*, 36–39.
141. Ibid., 32–35. The authors note that this is a post-Kantian development, which does not apply to Bacon.
142. Glanvill, *Philosophia Pia*, 45.
143. Ibid., 45–46.
144. Ibid., 43–44.
145. Ibid., 7–16. The “sacrifice of praise” is a biblical phrase Glanvill quotes from Hebrews 13:15. Cf. also Sprat, *History*, 349.

CHAPTER FOUR

1. Glanvill, *Vanity*, 15. The survey is in chaps. 3–6.
2. *Ibid.*, 61.
3. See Holden, “Robert Boyle,” 293. This is different, Holden explains, from equating things above reason with the matter of revelation, i.e., with things that reason alone cannot discover. On the theological debate over the role of reason in judging revelation as background to Boyle’s approach, see Wojcik, *Robert Boyle*, part 1.
4. Boyle, *Things Above Reason and Advices*, WRB, 9: 361–424, entirely dedicated to the topic; see also *Appendix*, WRB, 12: 396–98.
5. Wojcik, *Robert Boyle*, 7–9.
6. *Ibid.*, 214. See also Harrison, *Fall of Man*, 217–19.
7. Sargent, *Diffident Naturalist*, 115.
8. *Ibid.*, 124–28 and *passim*.
9. Boyle, *Things Above Reason*, WRB, 9: 370, 373.
10. *Ibid.*, 371.
11. *Ibid.*
12. *Ibid.*, 371, 380. Cf. also 383, 386, 387, 392 (all instances of the vocabulary of “proportion” and “disproportion”).
13. *Ibid.*, 382.
14. In the “Praeface Introductory” to his *Sceptical Chymist*, Boyle explains the framing of his own persona in that dialogue on the mold of Carneades (WRB, 2: 211–12). See Condren, “*Persona*,” 82, for comments on Boyle’s antidogmatic Carneades figure.
15. Boyle, “Doctrine of Thinking,” in *Early Essays*, 185. The 1640s was the period of Boyle’s close contacts with the Baconian Puritan reformers of the Hartlib circle. See Webster, *Great Instauration*, part 2; Oster, “Biography”; M. Hunter, *Boyle: Between God and Science*, 65–67.
16. Boyle, “Doctrine of Thinking,” in *Early Essays*, 185–202. In his notes, Harwood draws attention to the common language Boyle’s “Doctrine of Thinking” shares with such contemporaneous works as Burton’s or Wright’s (187 n. 5, 192 n. 16). M. Hunter suggests that Boyle’s “raving,” together with “scruples” and “diffidence,” forms part of the early modern vocabulary of casuistry and points to a quasi-medical mental condition that Boyle suffered from (*Boyle: Between God and Science*, 35, 48, 60, 101, 207). For a reading of Boyle’s personality as “dysfunctional” and for his obsession with casuistry, see M. Hunter, *Robert Boyle (1627–1691)*, chaps. 3 and 4. My reading emphasizes the wider circulation of this vocabulary and its inscription in a *cultura animi*, rather than psychoanalytical, perspective.
17. Boyle, *Occasional Reflections*, WRB, 5: 16.
18. *Ibid.*, 24–25.
19. *Ibid.*, 32, 33.

20. Boyle, "Doctrine of Thinking," in *Early Essays*, 185.
21. Boyle, *Occasional Reflections*, WRB, 5: 49.
22. Boyle, *Aretology*, in *Early Essays*, 8, 50, 55–56. See also Shapin, *Social History of Truth*, 171–72.
23. Boyle, *Occasional Reflections*, WRB, 5: 54.
24. *Ibid.*, 26.
25. The world is seen as a great "*Conclave Mnemonicum*, and a well furnished *Promptuary*, for the service of Piety and Vertue" (*ibid.*, 19).
26. Seneca, *Natural Questions* II.lix, *Workes*, 803. The marginal gloss in this edition explains that such is the "true use of this part of naturall Philosophie which intreateth of lightnings, consisting in the contempt of death." Boyle's enthusiastic encounter with Seneca's work in the early 1640s is described in M. Hunter, *Boyle: Between God and Science*, 49. The religious use of the experimental study of nature is a theme Boyle already explores in two texts of 1649, "Of the Study of the Booke of Nature" and "Essay of the Holy Scriptures" (WRB, vol. 13, and M. Hunter, *ibid.*, chap. 5).
27. The passage from *Natural Questions* is reprised in a vindication of the "preaching" tone of the discourse in *Usefulness*, on the model of Seneca, who also chose to "season his Natural Speculations with Moral Documents and Reflections" (*Usefulness*, part 1, WRB, 3: 275).
28. Boyle, *Usefulness*, part 1, WRB, 3: 199.
29. Boyle, *Reason and Religion*, WRB, 8: 255.
30. *Ibid.*, 256.
31. *Ibid.*, 257.
32. Boyle, *Excellency of Theology*, WRB, 8: 59.
33. Boyle, *Things Above Reason*, WRB, 9: 373.
34. Boyle, *Notion of Nature*, WRB, 10: 439–42.
35. Boyle, *Things Above Reason*, WRB, 9: 371.
36. Boyle, *Advices*, WRB, 9: 398.
37. *Ibid.*, 400.
38. *Ibid.*, 401.
39. *Ibid.*, 406.
40. *Ibid.*, 413f.
41. *Ibid.*, 421f.
42. Boyle, *Things Above Reason*, WRB, 9: 396.
43. *Ibid.*, 395.
44. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 291.
45. Du Moulin, *Peace and Contentment*, 341.
46. Sprat, *History*, 33–34.
47. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 304–5.
48. *Ibid.*, 322.
49. *Ibid.*, 305.
50. *Ibid.*, 306.
51. Boyle, *Occasional Reflections*, WRB, 5: 32–33.

52. Boyle, *Usefulness*, part 1, WRB, 3: 200.
53. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 285.
54. *Ibid.*, 322.
55. *Ibid.*, 323.
56. Boyle, *Reason and Religion*, WRB, 8: 255.
57. See Greene, “Synderesis” and “Whichcote.” The notions and principles inscribed in man’s soul on this view included the existence of a God, the distinction between good and evil, and some basic moral precepts.
58. Greene, “Synderesis.”
59. Spurr, “‘Rational Religion,’” 575–80.
60. Holden, “Robert Boyle,” 289–90.
61. Mulligan, “Robert Boyle,” 237, 250. See also Mulligan, “‘Reason,’” for similar arguments related to the first half of the century.
62. Boyle, *Appendix*, WRB, 12: 415.
63. *Ibid.*, 405. In this sense, there is a philosophical sect that comes closest to the true title of philosophy, i.e., the “Potamonian” or “Eclectic” sect, whose aim was “selecting and picking out of each [sect] that which seemed most consonant to truth and reason, and leaving the rest to their particular authors and abettors.” On eclecticism in early modern philosophy, see Kelley, “Eclecticism”; Gaukroger, *Francis Bacon*, 28–36.
64. Boyle, *Appendix*, WRB, 12: 424.
65. *Ibid.*, 422.
66. Boyle, *Advices*, WRB, 9: 411.
67. *Ibid.*, 412.
68. Boyle, *Appendix*, WRB, 12: 417.
69. *Ibid.*, 419–20. The examples of “intuitive truths,” of “absolute truths,” and of “primary dictates of reason” are similar, except that the instances of sense experience appear only among the “intuitive truths.”
70. Boyle, *Advices*, WRB, 9: 412.
71. Boyle, *Excellency of Theology*, WRB, 8: 66; cf. also *Reason and Religion*, WRB, 8: 281–82. See Sargent, “Scientific Experiment” and *Diffident Naturalist*.
72. See Popkin, *History of Scepticism*, 216–18.
73. Boyle, *Reason and Religion*, WRB, 8: 257.
74. Boyle, *Appendix*, WRB, 12: 382.
75. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 322–23.
76. Boyle, *Appendix*, WRB, 12: 422. To see reason as informed by either philosophy or revelation is to see it “organically” (i.e., as using “organs” or instruments), whereas to see it as acting on its own axioms is to take it “essentially.” In *Reason and Religion*, there is a similar division of “ways of informing the Understanding”: reason can be furnished with “its inbred Notions and the more common Observations,” or it can be informed by “some Philosophical Theory,” by “Experiments purposely devis’d,” or by “Testimony Humane or Divine” (WRB, 8: 278).

77. Boyle, *Reason and Religion*, WRB, 8: 255. On reason *in abstracto* versus reason *in concreto*, see also Holden, "Robert Boyle," 289.
78. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 323.
79. Ibid., 326. See also *Reason and Religion*, WRB, 8: 278: correct judgment, whereby an opinion is "judg'd most agreeable to right Reason," depends on the best "information" reason gathers from the relevant sources of experience, and *ought not* to be decided by abstracted reason or "the Faculty furnish'd only with such and such Notions, whether vulgar or borrow'd from this or that Sect of Philosophers."
80. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 307.
81. Ibid., 307–9.
82. Ibid., 327.
83. Boyle, *Appendix*, WRB, 12: 423.
84. Boyle, *Reason and Religion*, WRB, 8: 278.
85. Holden, "Robert Boyle," 290 n. 28. See for instance Boyle, *Reason and Religion*, WRB, 8: 292.
86. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 323–24. Shapin, *Social History of Truth*, chap. 7, comments on Boyle's rejection of mathematical "dogmatism" in favor of experimental "modesty" (335) from the perspective of the concern with the "moral order of the experimental community" (313). I am interested here in the same issue from the perspective of the concern with the inner order of the inquirer's mind.
87. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 325.
88. Boyle, *Excellency of Theology*, WRB, 8: 33.
89. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 326–27.
90. Boyle, *Reason and Religion*, WRB, 8: 292.
91. Boyle, *Excellency of Theology*, WRB, 8: 42.
92. Ibid., 44.
93. Boyle, *Appendix*, WRB, 12: 424.
94. Boyle, *Usefulness*, part 1, WRB, 3: 218, 234.
95. Boyle, *Excellency of Theology*, WRB, 8: 44; cf. *Final Causes*, WRB, 11: 93.
96. Shapin, *Social History of Truth*, 182, and "Personal Development," 339.
97. Shapin, *Social History of Truth*, chap. 4. See also Shapin, "Scholar and a Gentleman."
98. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 288.
99. See Augustine, *Confessions* X.iv, 2: 81–83.
100. Bacon, "Praefatio," *Instauratio Magna*, WFB, 4: 18–19.
101. Condren, *Argument and Authority*, chap. 6.

CHAPTER FIVE

1. Locke, "Of Study," in *Educational Writings*, 419–20.
2. See Woolhouse, *Locke*, 89.

3. Locke, "Anatomie" (1668) and "De Arte Medica" (1669); cf. Woolhouse, *Locke*, 86–87, 92–94.
4. Locke, "Of Study," in *Educational Writings*, 420. Similar thoughts are expressed in another essay of the same year, "Knowledge its extent and measure" (or "Understanding"), in *Political Essays*, 260–65.
5. Locke, "Of Study," in *Educational Writings*, 407–10.
6. Locke's views on this topic have been seen as indebted to various contemporary developments. Popkin, *History of Scepticism*, places them within the line of "mitigated scepticism." Van Leeuwen, *Problem of Certainty*, and B. Shapiro, *Probability and Certainty*, discuss them against the wide natural philosophical and theological background to this problem. Other authors argue for the influence of Boyle and Sydenham (Osler, "John Locke and the Changing Ideal"; Rogers, "Boyle, Locke, and Reason") or of Gassendi (Kroll, "Question of Locke's Relation to Gassendi"); but see Milton, "Locke and Gassendi," for a case against Gassendi's influence on Locke.
7. Yeo, "John Locke and Polite Philosophy," 265. See also Marshall, *John Locke*, 170.
8. On their collaboration, see Stewart, "Locke's Professional Contacts."
9. Locke, *Essay* IV.ii, 530–38; IV.iii.18, 549; IV.iii.21, 553.
10. Locke, *Essay* IV.iii.29, 559–60.
11. Locke, *Essay* I.i.6, 46. Cf. also I.i.4, 44–45; I.i.5, 45–46; IV.xi.8, 634; IV.xii.11, 646.
12. Locke, *Essay* IV.xiv.2, 652.
13. Locke, "Of Study," in *Educational Writings*, 421. Cf. also the occurrence of "self-knowledge," together with "mastery of the passions," "search for counsel," and "directing of minds," among the means to *prudence*, leading to both heavenly happiness and earthly tranquility, by the side of physical, economic, and political well-being, in Locke's *Adversaria* of 1670 and 1681, in *Political Essays*, 215, 289.
14. Previous reflections on the influence of passions and heated imagination on men's judgments are, e.g., in an early letter to Thomas Westrowe (October 1659) (in Locke, *Corr.*, 1: 123), or in a 1682 short essay called "Enthusiasm" (in *Political Essays*, 289–91); on the mismanagement of assent, announcing *Essay* IV.xx, in the First Draft (in *Drafts*, 66–74), or in a couple of essays of 1679, "Justitia" and "Opinion" (in *Political Essays*, 273–74).
15. Locke, *Conduct* §12, 47. Locke uses medical vocabulary, e.g., his talk of "remedies" and "cure," §2, 6; §12, 47. For a general assessment of this text, see Schuurman, "John Locke."
16. The opening lines include an explicit reference to the Baconian idea of the adoration of the idols of men's minds: *Conduct* §1, 3–4.
17. Locke, *Essay* IV.xvii.14, 683.
18. Locke, *Conduct* §4, 16.
19. Locke, *Essay* I.i.5–6, 46–47.

20. For the latter, more recent view on Locke, see especially Spellman, *John Locke*; Harrison, *Fall of Man*, 221–33. Marshall, “John Locke’s Religious, Educational and Moral Thought,” describes the evolution of Locke’s thought between the poles of Augustinianism and Socinianism.
21. Locke, *Essay* I.i.2, 44.
22. Locke, *Essay* II.ii–xi; IV.xvii.2.
23. The reception of Locke’s *Essay* as a logic, and the logical background to this work, have been illuminated in important recent scholarship: see, e.g., Buickerood, “Natural History of the Understanding”; Schuurman, “Locke’s Way of Ideas” and *Ideas, Mental Faculties and Method*; Winkler, “Lockean Logic”; Dawson, *Locke*; and, for an instructive summary of this literature, with doubts as to the pertinence of many aspects of the logical connection, Serjeantson, “Human Understanding.”
24. Locke, *Essay*, I.i.3, 44.
25. Locke, *Essay* I.i.6, 46.
26. Locke, *Essay* IV.xvi.1, 657–58. Locke believes that “there are very few lovers of Truth for Truths sake” (*Essay* IV.xix.1, 697) and that this is a condition very hard to attain.
27. Locke, *Conduct* §6, 26–27.
28. Here I disagree with Serjeantson, who argues that there is no “directive” dimension to the natural historical method of the *Essay* (“Human Understanding,” 169).
29. Locke, *Conduct* §12, 47.
30. Locke, *Essay* IV.xvii.2–4, 668–71. See Schuurman, “Locke’s Way of Ideas,” on Locke’s “logic of ideas” as an alternative to syllogistic logic, and his account of error in conformity with this new logic (47–50).
31. Locke, *Essay* IV.xvii.17, 685.
32. Locke, *Essay* IV.xvii.9–13, 682–3. Cf. IV.iii.22, 553.
33. Locke, *Essay* IV.xx.2–3, 707–8.
34. Locke, *Essay* IV.xx.4, 708–9.
35. Locke’s writings on toleration strongly delimit the province of the magistrate from that of the “care of souls,” which should be the person’s concern (*Epistola*, 67, 91).
36. Locke, *Essay* IV.xx.6, 710.
37. Locke, *Essay* IV.xx.17, 718.
38. Locke, *Essay* IV.xx.18, 719. Cf. *Conduct* §3, 7, on the “implicit Faith” of “those who seldom reason at all”—one of the general “miscarriages” of the understanding, by the side of passions and partial views.
39. Locke, *Essay* IV.xx.8–10, 712–13. Scott, *Recollection and Experience*, chap. 10, offers an insightful analysis of Locke’s critique of “blind credulity” in the context of his attack on the (moral) dangers of innatism. The deep concern “to fight off laziness, in particular that of borrowing one’s principles from others” (253) is a measure of Locke’s commitment to Socratic examination.

40. E.g., Locke, *Essay* IV.iii.6, 540; IV.iii.20, 552; IV.xii.5–6, 642; IV.xvi.3, 659; *Conduct* §6, 20–21; §23, 75; §33, 103; §34, 105.
41. Locke, *Essay* IV.xx.11–12, 713–15.
42. Locke, *Conduct* §3, 7; cf. §13 bis, 50–51. See also “Of Study”: the Catholic belief in the infallibility of the church is with “implicit faith or fear or interest” (in *Educational Writings*, 417). Two instructive contextual discussions of Locke on error, Wood, “Baconian Character,” and Schuurman, “Locke’s Way of Ideas,” focus on custom and habit as sources of error but mention the passions only in passing. They do not treat the other distempers of the mind.
43. Locke, *Essay* IV.xix.7–8, 699–700.
44. Locke, *Essay* IV.iii.18, 549.
45. Locke, *Essay* II.xxix.12, 368.
46. Locke, *Essay* IV.xii.6, 642. The reference to “names” echoes Locke’s analysis of the “abuse of words” in III.x. Indeed, the confusion of ideas “carries with it a secret reference to Names” (II.xxix.12, 367). See Dawson, *Locke*, for an analysis of Locke’s approach to language in book III of the *Essay*, including the “semantic sins” the use of words propagates (275). Locke’s educational project included the “metamorphosis of speakers” (300)—a project about which Locke professed both skepticism and hope.
47. For Locke, the association of ideas is a *malady* of the mind—a notion that is lost in some eighteenth-century developments in associationism. See Buckle, “British Sceptical Realism,” 22.
48. Locke, *Essay* II.xxxiii.4–5, 395.
49. My analysis thus goes against Schuurman’s interpretation of *habit* as Locke’s principal source of error, and of the association of ideas as the privileged instance of habit (“Locke’s Way of Ideas,” 51–54). Locke acknowledges “education” as that to which this “madness” is usually and rightfully imputed; yet, he says, to rest in that explanation is to fail to get to the “bottom of the Disease” (*Essay* II.xxxiii.3, 395).
50. Locke, *Essay* II.xxxiii.17–18, 400–401.
51. Locke, “Of Study,” in *Educational Writings*, 415.
52. *Ibid.*, 416–17.
53. Locke, *Conduct* §18, 58.
54. Locke, *Conduct* §23, 67; cf. §3, 8–10. The “partial views” thus developed are a distorted effect of the natural limitations of human beings in this life: “we see but in part, and we know but in part” (a rephrasing of 1 Corinthians 13:12).
55. Locke, *Conduct* §§16–17, 55–56.
56. Locke, *Conduct* §§37–38, 109–10.
57. Locke, *Conduct* §10, 41.
58. *Ibid.*, 42.
59. Locke, *Conduct* §25, 81–82.
60. Locke, *Conduct* §26, 82.

61. Locke, *Essay* IV.xvii.4, 672.
62. Locke, *Conduct* §24, 77, 79. Significantly, the epigraph of the *Conduct* is a passage from the opening section of Cicero's *De Natura Deorum* (I.1), which condemns "rashness" (*temeritate*)—which is "either to hold a false opinion or to defend without hesitation propositions inadequately examined and grasped"—as "unworthy of the gravity and constancy of the wise" (*sapientis gravitate atque constantia*). Translation from Cicero, *Nature of the Gods*, 3.
63. Locke, *Conduct* §15, 55. Cf. also §19, 61, where the same tendency of the mind is explained by its "backwardness": "the Mind is backward in it self to be at the pains to trace every Argument to its Original, and to see upon what Basis it stands, and how firmly."
64. Locke, *Conduct* §6, 22.
65. *Ibid.*, 22–24.
66. Locke, *Conduct* §43, 128–29. Cf. "Of Study": the mind's "restiness" covers both its stiffness and its precipitation (in *Educational Writings*, 414).
67. Locke, *Conduct* §13, 48–49.
68. Locke, *Conduct* §15, 54. Cf. also *Essay* IV.xiv.3, 653: the mind sometimes exercises judgment where demonstrative proof should be sought because of its "Laziness, Unskilfulness, or Haste."
69. Locke, *Conduct* §§14–15, 51–54; §7, 31. "Disputes" are also signaled as instances of the abuse of words, of the ill use of maxims, and of trifling propositions in the *Essay* (III.x.9, 495; IV.vii.11, 600; IV.viii.13, 617). On scholastic disputation as one of Locke's targets, see Yeo, "John Locke and Polite Philosophy."
70. Locke, *Essay* IV.ii.4, 532. Even the identity and distinction of ideas—which for Locke are perceived by intuition—require, in order to compel assent, a "mind with attention" (IV.vii.4, 592).
71. Locke, *Essay* IV.xiv.3, 653.
72. Locke, *Conduct* §6, 26; §7, 30.
73. Locke, *Essay* IV.xv.5, 656.
74. Locke, *Essay* IV.xv.4, 656; IV.xvi.5, 661; IV.xvi.12, 665.
75. Locke, *Essay* IV.xv.2, 655; detailed at IV.xvi.6–9, 661–63. At IV.xvi.13–14, 667–68, Locke adds considerations on the special cases of miracles and of revelation, which, once attested by reason as truly being such, are accepted with an "assurance" equivalent to that of knowledge. See Wolterstorff, "Assurance of Faith."
76. Locke, *Essay* IV.xvi.1, 658.
77. Locke, *Essay* IV.xvi.9, 663. Shapin has commented on the looseness of Locke's rules for assessing testimony and argued that, rather than formalized "rules," they are rather to be seen as prudential "maxims" for the use of the gentlemanly practitioners of epistemological decorum (*Social History of Truth*, 211–42). I will here look at the question of the regulation of assent, not as founded on socially validated practical skills, but as a practical exercise involved in the virtuous training of the mind.

78. Locke, *Essay* II.xix, 226–28.
79. Locke, *Conduct* §29, 89–90.
80. Locke, *Conduct* §43, 128. When achieved, it provides one of the types of intellectual pleasure; cf. *Essay* II.xxi.18, 233: the pleasure of “well directed study in the search and discovery of Truth.”
81. Locke, “Of Study,” in *Educational Writings*, 417 (“all our force and all our sincerity”); *Essay* IV.xx.10, 713 (“candid and ingenuous”); IV.xx.11, 714 (courage—implicit in Locke’s rhetorical question whether the “learned Professor” would ever be able to “disrobe himself” of his old opinions and “turn himself out stark naked, in quest a-fresh of new Notions”—as opposed to being “*afraid to question those Principles*” imbibed in early childhood, I.iii.25, 83).
82. Locke, *Conduct* §12, 45.
83. Locke, *Conduct* §10, 39 (“every one impartially to examine himself”); §39, 119 (“observe the very quick, and almost imperceptible Motions of the Mind in its habitual Actions” in the case of the association of ideas); §43, 135 (the art of governing the passions is “to be got by Study, and acquaintance with the Passions”).
84. Locke, *Conduct* §32, 99.
85. Locke, *Conduct* §4, 19.
86. Locke, *Conduct* §3, 12.
87. Locke, *Conduct* §32, 100.
88. Locke, *Essay* IV.iii.20, 552.
89. Locke, *Conduct* §3, 12.
90. Locke, *Conduct* §12, 44. Cf. also §32, 99: the eyes (i.e., the discerning faculty) are “dimn’d or dazl’d” by interest, passion, or the habit of disputation.
91. Locke, *Conduct* §27, 84.
92. Locke, *Conduct* §§3–4, 15–16.
93. Locke, *Conduct* §4, 17.
94. Locke, *Conduct* §6, 26. Cf. *STE* §107, 167: minds, like bodies, can be “made vigorous, easie, and strong” by education. See also Wolterstorff, *John Locke*, 152–54.
95. Locke, *Conduct* §19, 60. The “chewing” and “digesting” of what one reads is a well-known *topos* of humanist literature: see, e.g., Bacon, “Of Studies,” *WFB*, 6: 497–98; Montaigne, “On schoolmasters’ learning” and “On educating children,” *Essays*, 159–99. Among the ancient sources are Seneca’s “On gathering ideas” (Ep. II.lxxxiv) and Plutarch’s “How a young man ought to hear poets,” chapter 2 of his *Morals*.
96. Locke, *STE* §177, 234.
97. Locke, *STE* §180, 236.
98. Locke, *STE* §31, 103.
99. Locke, *STE* §122, 186.

100. Locke, *STE* §46, 112. For a convincing argument in favor of the compatibility of habituation and autonomy in Locke's educational thought, see Neill, "Locke on Habituation."
101. Locke, *STE* §98, 161.
102. Locke, *STE* §195, 249. Locke similarly includes the cultivation of a "love" and "true relish" for *virtue* among the tasks of education: §58, 117; §70, 132.
103. Locke, *Essay* IV.xix.1, 697.
104. Locke, "Of Study," in *Educational Writings*, 415.
105. Locke, *Conduct* §32, 99; *Essay* IV.vii.11, 601. There is a delicate moment of the meeting of mind and truth—the moment of "persuasion" or "conviction"—and Locke warns against tinkering with it: "'Tis not safe to play with Error" (*Conduct* §32, 100).
106. *Conduct* §40, 120. Cf. the warning in the *Essay*: disputation turns young men away from "the sincere Search and Love of Truth" and makes them "doubt whether there is any such thing, or at least worth the adhering to" (IV.vii.11, 601).
107. Locke, *Essay* IV.xix.1, 697.
108. Locke, *Essay* II.vii.3, 129. Compare Locke's account of the determination of the *will* by the master passion of uneasiness at II.xxi.37, 255: until uneasiness activates the will, the idea of the good remains in the mind as simply the object of "bare unactive speculation."
109. If this picture of Locke's views on the pursuit of truth is correct, it is very much in tune with Locke's views on the pursuit of happiness as John Colman has reconstructed them. Colman argues that the "desire for happiness," which, on Locke's account, motivates human behavior and practical reasoning, is a general orienting aim that in its best form, i.e., the form most suitable to a rational being, is a desire for the Christian supreme happiness of heaven. Yet it may well, and most of the time does, take the form of the pursuit of private ends, which is actually a less than fully rational pursuit of imperfect happiness in this world. To educate rationality in this case is to learn to pass from the latter to the former kind of desire for happiness, which is also to learn how to love virtue (*John Locke's Moral Philosophy*, 215–34).
110. Locke, *Conduct* §12, 44–45.
111. It goes against love of opinion, or of prejudice (§11, 42). See also Nuovo, "Introduction," xxiii.
112. Locke, *Conduct* §10, 42.
113. Locke, *Conduct* §33, 101.
114. Locke, *Conduct* §21, 65; §18, 58. Locke adds that such a "universal taste" is not for purposes of building encyclopedic minds, but for exercising the strength and suppleness of the judging capacity and for freeing the mind (*ibid.*, 59). On Locke's rejection of the encyclopedic ideal, see Yeo, "John

- Locke's 'Of Study'" and "John Locke and Polite Philosophy." On Locke's proposal of managing "universal" information by means of commonplace books, see Yeo "John Locke's 'New Method'"; Dacome, "Noting the Mind."
115. Locke, *Conduct* §10, 42.
 116. Locke, *Conduct* §12, 45.
 117. Locke, *Conduct* §10, 42.
 118. For an interpretation of Locke on reasoning that also goes against the justification of belief approach, see also Owen, "Locke on Reasoning," 213, 217.
 119. E.g., Locke, *Essay* I.ii.1, 48, addressing "those who, with me, dispose themselves to embrace Truth, where-ever they find it."
 120. Zagzebski, *Virtues of the Mind*, 3. For a survey of the rise of virtue epistemology in the 1980s, see Axtell, "Introduction." But for a skeptical view, see Annas, "Structure of Virtue."
 121. Zagzebski, *Virtues of the Mind*, 137–62.
 122. Ibid., 112. See also Roberts and Wood, *Intellectual Virtues*, 8, 60, 71, 97.
 123. Roberts and Wood, *Intellectual Virtues*, 21, 26. I thank Peter Anstey for bringing this book to my attention.
 124. Ibid., 22.
 125. Wolterstorff, *John Locke*, xviii; cf. 148–58.
 126. Ibid., 94–104.
 127. See also Passmore, "Locke," the first proponent of this issue in his important article of the 1970s. But see Nuovo, "Introduction," xxvi, for a brief but forceful criticism of the ethics-of-belief approach to Locke.
 128. Losonsky, "John Locke," against Passmore, "Locke," and Ayers, *Locke*, 1: 104–12. See also Losonsky, *Enlightenment and Action*, for a more general thesis regarding the interweaving of thought, passion, and action in a number of seventeenth- and eighteenth-century thinkers; Roberts and Wood, *Intellectual Virtues*, 120, 162–63 for a discussion of Locke's love of truth and "indifference" as virtues of the epistemic will; and 40, 61–64, 112 for a defense of the importance of the will to the intellectual virtues.
 129. Passmore, "Locke," 283, 299; Wolterstorff, *John Locke*, 94, 96; cf. also Tully, "Governing Conduct," 192, 199.
 130. Passmore, "Locke," 298; Wolterstorff, *John Locke*, 94, 96, 97.
 131. The "rational man" "having carefully enquired" and "done his utmost to inform himself," "has weighed [the proofs]," "upon full Examination" (*Essay* IV.xx.15–16, 716–17). I think that the two sections lend themselves to an analysis from the ethics-of-belief perspective on the voluntariness of belief only if considered in isolation from the rest of Locke's work.
 132. Losonsky, "John Locke," 269.
 133. Locke, *Essay* IV.xvi.4, 660.
 134. Ibid., 659. Cf. the "peace, equity and friendship" advocated in *Epistola*, 81. Salvation cannot rest on blind (coerced) belief (held with a *caeca mente*) but must rest on beliefs into which one has put one's "reflection, study, judgment, and meditation" (ibid., 71, 93–95). See Mendus, "Locke," for a

- defense of Locke's notion of "genuine" (religious) belief in his writings on toleration as opposed to "blind" (even if "sincere") belief. Mendus responds thus to Waldron, "Locke," who denies Locke the distinction, in a paper that approaches the matter from the voluntariness-of-belief perspective. For discussions of Locke on toleration and belief, see also Marshall, *John Locke*, 360–64; Vernon, *Career of Toleration*, chap. 1.
135. Marshall, *John Locke*, 164, 300 for *amicitia* and chaps. 5 and 7 for the Ciceronian virtues embraced by Locke. Locke's friendships (among which those with the first Earl of Shaftesbury, Nicholas Toinard, Damaris Cudworth, Philipp van Limborch, and William Molyneux) are evoked in Woolhouse, *Locke*. For an account of the circles of virtuosi friends in which Locke took part or that he helped create in London, Paris, Rotterdam, Amsterdam, or at Oates, see Simonutti, "Circles of *Virtuosi*."
 136. Locke, "Of Study," in *Educational Writings*, 417.
 137. Locke to William Molyneux, April 1695, in Locke, *Corr.*, 5: 351.
 138. Locke, "Of Study," in *Educational Writings*, 422.
 139. Colie, "Essayist in his *Essay*," 251.
 140. Walmsley, *Locke's Essay*, 126 and chap. 5.
 141. Locke, *STE* §90, 148. Cf. also §§76, 78, 90, 93, 94.
 142. Locke, *STE* §100, 162.
 143. Locke, *STE* §§81–82, 142–43; §98, 161; §108, 118–22; §166, 218–19.
 144. Locke, *STE* §90, 148. Several of these "wrong Inclinations" mirror the moral-cum-intellectual "defects" of the mind charted in the *Conduct*, e.g., the unruly appetites, the idleness, the forwardness, the self-love, the cowardice, the carelessness, the wandering of thoughts, the obstinacy, or the narrowness of the mind: *STE* §39, 108; §94, 156; §107, 166; §110, 170; §115, 174; §123, 186; §167, 221–23.
 145. Locke, *STE* §105, 164.

CHAPTER SIX

1. Hadot, *Philosophy as a Way of Life*, 193–94 (to the two practical disciplines is added the discipline of inclinations, a "lived ethics," as expressed in the doctrine of duties); cf. also 87, 97–99, 197–98. See also Osler, *Atoms, Pneuma, and Tranquillity*, 3.
2. Boyle, *Usefulness*, part 1, *WRB*, 3: 199, 200.
3. The idea is pervasive in *Usefulness*, part 1, and *Christian Virtuoso*, part 1. Cf. also Glanvill, *Philosophia Pia*, 133.
4. Bacon, *Advancement I*, *WFB*, 3: 300–301.
5. Boyle, *Usefulness*, part 1, *WRB*, 3: 271. The reference is to Bacon, *Advancement I*, *WFB*, 3: 267–68.
6. Locke, *Essay* IV.xii.12, 647.
7. Wilkins, *Beauty of Providence*, 66, 91–119.
8. Du Moulin, *Peace and Contentment*, 164–65.

9. Power, *Experimental Philosophy*, 183.
10. Boyle, *Usefulness*, part 1, WRB, 3: 222, 225, quoting Psalms 104:24 (“How manifold are thy works, O Lord; in Wisdom hast thou made them all”), Ephesians 3:10 (“the manifold Wisdom of God”).
11. Boyle, *Usefulness*, part 1, WRB, 3: 255, 253.
12. Boyle, *Notion of Nature*, WRB, 10: 469–70.
13. *Ibid.*, 469; cf. *Usefulness*, part 1, WRB, 3: 248.
14. See Anstey, *Philosophy of Robert Boyle*, part 1, for an extended analysis of Boyle’s corpuscularian philosophy.
15. Boyle, *Notion of Nature*, WRB, 10: 469. For my understanding of Boyle’s conception of nature as a system of interrelations I am indebted to Sargent’s fine work, *Diffident Naturalist*. The relations of the natural mechanism are the expression of the “Art of God”; for commentaries on this notion, see Cook, “Divine Artifice”; Newman, *Promethean Ambitions*, 271–83.
16. Boyle, *Forms and Qualities*, WRB, 5: 313 and the whole section “An Excursion about the Relative Nature of Physical Qualities,” 309–22.
17. Boyle, *Cosmical Qualities*, WRB, 6: 287–88. Such qualities most probably depend on the “mechanical affections”; but there are, Boyle suggests in this text, qualities that depend on the general fabric of the “system” of the world itself and that may have a nonmechanical explanation. See Henry, “Boyle and Cosmical Qualities.”
18. Locke, *Essay* IV.vi.11, 587.
19. *Ibid.*, 586. For a comment in the context of Locke’s conception of secondary qualities, see Alexander, *Ideas, Qualities, and Corpuscles*, 178–81.
20. Locke, *Essay* IV.vi.11, 585.
21. Locke, *Essay* IV.iii.16, 548.
22. Locke, *Essay* IV.iii.17, 548. Cf. also III.vi.3, 440 (knowledge of real essences is denied to man but available to God and angels). For the references to Locke’s *Essay* in this section, I have found Nuovo’s “List of Theological Places” extremely useful.
23. Boyle, *Usefulness*, part 1, WRB, 3: 257.
24. Osler, “Robert Boyle on Knowledge of Nature,” 46.
25. Henry, “Boyle and Cosmical Qualities,” 132; Wojcik, *Robert Boyle*, chap. 8. Cf. Oakley, *Omnipotence*; Osler, “Intellectual Sources” and *Divine Will*; and the literature discussed in Harrison, “Voluntarism and Early Modern Science.”
26. Henry, “Voluntarist Theology”; Harrison, “Voluntarism and the Origins of Modern Science.”
27. Boyle, *Notion of Nature*, WRB, 10: 469.
28. For accounts of Boyle’s conception of God’s relation with the created world that emphasize the “concourse” rather than the arbitrary power, see Shanahan, “God and Nature”; Sargent, *Diffident Naturalist*, 99–103; Anstey, “Boyle on Occasionalism” and *Philosophy of Robert Boyle*, chap. 7.
29. Boyle, *Usefulness*, part 1, WRB, 3: 257.

30. Boyle, *Excellency of Theology*, WRB, 8: 40.
31. Boyle, *Usefulness*, part 1, WRB, 3: 203.
32. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 300.
33. Boyle, *Christian Virtuoso*, part 2, WRB, 12: 496.
34. Boyle, *Final Causes*, WRB, 11: 144, cf. also 103. See also *Christian Virtuoso*, part 2, WRB, 12: 483; "Of the Study of the Book of Nature," WRB, 13: 149.
35. Locke, *ELN*, essay 4, 147.
36. *Ibid.*, 157. Paralleling the distinction between a voluntarist and an intellectualist conception of God is a similar dichotomy with reference to the nature of obligation within a natural law theory. Oakley, "Locke, Natural Law and God," argues that Locke was a committed voluntarist. Von Leyden thinks he tried to keep an uneasy balance between the two perspectives ("Introduction," 43–60). Ward, "Divine Will," Tuckness, "Coherence of a Mind," and Colman, "Locke's Empiricist Theory," have persuasively argued in favor of the coherent balance of Locke's views on this question.
37. Locke, "Understanding," in *Political Essays*, 260, 264.
38. *Ibid.*, 264–65.
39. Locke, *Essay* I.i.5, 45.
40. Locke, *Essay* I.ii.1, 48; I.iv.9, 89; I.iv.12, 91; I.iv.22, 100.
41. Pascal, "Man's disproportion," in *Pensées*, 58–64. For commentaries on this theme, see Carraud, *Pascal*, 393–422; Alexandrescu, *Le paradoxe*, 193–202; Jones, *Good Life*, chap. 4.
42. Boyle, *Christian Virtuoso*, part 2, WRB, 12: 484. Sargent usefully elaborates on this theme, on its theological grounding, and on its methodological consequences (*Diffident Naturalist*, chaps. 4 and 5).
43. Boyle, *Christian Virtuoso*, part 2, WRB, 12: 487. For a Boyle-Cusanus connection in terms of the theme of the limits of reason, see Wojcik, *Robert Boyle*, 34.
44. Boyle, *Appendix*, WRB, 12: 419.
45. Boyle, *Excellency of Theology*, WRB, 8: 57; *Christian Virtuoso*, part 2, WRB, 12: 530. On Boyle's engagement with the genre of romances, see Principe, "Virtuous Romance."
46. Boyle, *Appendix*, WRB, 12: 397.
47. Boyle, *Usefulness*, part 1, WRB, 3: 281. Similarly, in the same work, Boyle writes of an appetite inscribed in our minds by God himself as an impetus toward the quest for the truth of nature (237). Cf. also *Excellency of Theology*, WRB, 8: 57.
48. Locke, *Essay* IV.vi.11, 587.
49. Locke, *Essay* II.xxiii.12, 302–3. For discussions of this passage in relation to the question of the (non)observability of the corpuscles, see Alexander, *Ideas, Qualities, and Corpuscles*, 184–86; and to the question of the relative endowments of men and angels, John Yolton, *Two Intellectual Worlds*, 74–77.
50. Locke, *Essay* II.xxiii.13, 304.

51. Locke, *Essay* IV.xii.10, 645.
52. Boyle, *Usefulness*, part 1, WRB, 3: 262.
53. *Ibid.*, 206.
54. Boyle, *Excellency of Theology*, WRB, 8: 57–58.
55. Boyle, “Proemial Essay,” WRB, 2: 17.
56. Boyle, *Forms and Qualities*, WRB, 5: 299.
57. Anstey, “Locke, Bacon, and Natural History.”
58. Locke’s “Advertisement” in Boyle’s *General History of the Air*, WRB, 12: 6.
59. Boyle, *Corr.*, 3: 170; Anstey and Hunter, “Robert Boyle’s ‘Designe.’”
60. Boyle, *Forms and Qualities*, WRB, 5: 302.
61. Knight and Hunter, “Robert Boyle’s *Memoirs*.”
62. Boyle, “Proemial Essay,” WRB, 2: 10–11; *Excellency of Theology*, WRB, 8: 82–89.
63. Boyle, *Forms and Qualities*, WRB, 5: 381.
64. For “queries” and “heads,” see M. Hunter, “Robert Boyle and the Early Royal Society”; for nature vexed, Anstey and M. Hunter, “Robert Boyle’s ‘Designe,’” 110–13.
65. Boyle, *Corr.*, 3: 171.
66. Anstey and M. Hunter, “Robert Boyle’s ‘Designe,’” 107.
67. Sargent, “Robert Boyle’s Baconian Inheritance,” 484. Cf. Sargent, “Scientific Experiment,” 39.
68. Boyle, “Requisites of a Good Hypothesis” and “Qualities & Conditions of an Excellent Hypothesis.”
69. The “Excellency and Grounds of the Mechanical Hypothesis,” appended to the 1674 edition of the *Excellency of Theology* (WRB, vol. 8), was intended as an illustration of the “good hypothesis”: M. Hunter, *Boyle: Between God and Science*, 176.
70. Boyle, “Proemial Essay,” WRB, 2: 21–23.
71. Boyle, *Christian Virtuoso*, part 1, WRB, 12: 326.
72. Boyle, “Proemial Essay,” WRB, 2: 14; *Christian Virtuoso*, part 1, WRB, 12: 324; *Reason and Religion*, WRB, 8: 281. See Sargent, “Scientific Experiment” and “Learning from Experience.”
73. Boyle, “Proemial Essay,” WRB, 2: 14. See also *Excellency of Theology*, WRB, 8: 89: we should consider how difficult it is to build an “Accurate Hypothesis upon an Incomplete History of the *Phaenomena* ’tis to be fitted to,” particularly in view of the prerequisites of a “good hypothesis.”
74. Boyle, *Corr.*, 3: 173. It is precisely such a “probationary” nature of the titles of inquiry that Locke also recommends in his “Advertisement” to the *General History of the Air*, while at the same time signaling its Baconian pedigree (WRB, 12: 6).
75. John Yolton, *Locke*; Anstey, “Locke, Bacon, and Natural History” and “Locke on Method.” For the hypothetico-deductive interpretation, see Laudan, *Science and Hypothesis*; Osler, “John Locke and the Changing Ideal”; Farr, “Way of Hypotheses”; and the literature cited in Anstey, “Locke, Bacon, and Natural History.”

76. John Yolton, *Locke*, 68.
77. Locke, *Essay* IV.ii.14, 537; IV.iii.9, 544; IV.iii.29, 560. Anstey, "Locke on Method," 27, 28. Cf. John Yolton, *Locke*, 90.
78. Cf. the description of the use of hypotheses at *Essay* IV.xii.13, 648: if well made, they are "at least great helps to the Memory, and often direct us to new discoveries." The passage ends with a warning against letting one's hypothesis domineer one's mind by taking it as a dogmatic "principle," and with the quasi-dismissal of "most (I had almost said all) of the *Hypotheses* in natural Philosophy" as "very doubtful conjecture(s)." Anstey, "Locke on Method," 28.
79. Anstey, "Locke on Method," 33. In *Two Intellectual Worlds*, John Yolton dwells at greater length on Locke's speculative "conjectures." But these do not have a role in discovery; rather, they are "echoes of that a priori, deductive science of nature which he detailed but denied to man" (74). Locke's commitment to an idea of natural philosophy as unattainable *scientia* is also underlined in Ayers, "Foundations of Knowledge"; Downing, "'Status of Mechanism.'"
80. Locke, *Essay* IV.xii.7, 643.
81. Locke, *Essay*, IV.xii.9, 644.
82. Locke, *Essay*, IV.xii.10, 645.
83. Locke, *Essay* II.xxiii.23–24, 308–9.
84. Locke, *Essay* II.xxvii.25, 345.
85. Locke, *Essay* IV.vii.12–14, 604–5.
86. Locke, *Essay* IV.vii.15, 606.
87. Locke, *Essay* IV.xii.4, 642.
88. Locke, *Essay* IV.xii.12, 647.
89. Boyle, "Proemial Essay," *WRB*, 2: 14.
90. *Ibid.*, 12.
91. Boyle, *Excellency of Theology*, *WRB*, 8: 88.
92. Boyle, *Final Causes*, Proposition 4, *WRB*, 11: 145.
93. Locke, *Conduct* §6, 22.
94. Locke, *Essay* IV.xii.13, 648.
95. Locke and Sydenham as quoted in Meynell, "John Locke," 97. Cf. also *Essay* I.iii.24, 82. Anstey and Burrows, "Two Medical Essays," have settled the question of Locke as author of "De Arte Medica" and "Anatomia." Romanell, *John Locke and Medicine*, makes a strong case for the crucial influence Locke's medical interests had on his natural historical method. For the relation between Locke's medical inquiries and his growing allegiance to mechanical philosophy, see Milton, "Locke, Medicine, and Mechanical Philosophy"; Walmsley, "Development." For the medical collaboration between Boyle, Sydenham, and Locke, see Cunningham, "Thomas Sydenham"; Kaplan, *Medical Agenda*, 146–52.
96. See Anstey and Harris, "Locke and Botany." The authors point out the links between Locke's hitherto little appreciated interest in botany and his commitment to the natural historical method (167).

97. Boyle, "Proemial Essay," *WRB*, 2: 24–25.
98. Boyle, *Things Above Reason*, *WRB*, 9: 373.
99. See also Kaplan, *Medical Agenda*, 49–56, who argues that for Boyle the use of well-formed provisional hypotheses was to direct the study of the phenomena and spur further investigation in a spirit of humility and charity; see Sargent, *Diffident Naturalist*, 121–28, for comments on the value of this method as a fight against "prejudice."
100. Locke, *Essay* III.x.14, 497.
101. Locke, "Understanding," in *Political Essays*, 262.
102. Locke, *STE* §190, 245.
103. Boyle, *Usefulness*, part 1, *WRB*, 3: 237–39. Cf. also "Of the Study of the Book of Nature," *WRB*, 13: 150–53; *Excellency of Theology*, *WRB*, 8: 40, quoting Psalms 50:23; *Christian Virtuoso*, part 2, *WRB*, 12: 490. Glanvill also uses the phrase in his *Philosophia Pia*, 6, 12, quoting Hebrews 13:15, Psalms 47:7. For commentaries on this image, see Fisch, "Scientist as Priest," and Ben-Chaim, *Experimental Philosophy*, chap. 7, who argue for Boyle's indebtedness to the Hermetic tradition and to a Christian humanist conception, respectively.
104. For the theme of "science and religion" in general in the seventeenth century, see, e.g., Kroll, "Introduction." See also the debate between Grant, "God and Natural Philosophy," and Cunningham, "Identity of Natural Philosophy," around the latter's thesis that natural philosophy was always a theological discipline.
105. See Gaukroger, *Emergence of a Scientific Culture*, chap. 4: the idea of natural history as revelatory of divine purposes in creation was crucial to the legitimation of experimental philosophy in the latter half of the seventeenth century as an enterprise of "quasi-religious standing" (133). The way experimental and natural historical investigations were thought to reveal divine purposes (or final causes) is documented in Harrison, *Bible*, 161–76; Ogilvie, "Natural History," 93–96. For the type of explanation involving final causes in the seventeenth century, see Osler, "From Immanent Natures to Nature as Artifice"; Nadler, "Doctrines of Explanation."
106. Harrison, "Physico-Theology."
107. Harrison, *Bible*, 168. But see Daston, "Attention," for an interpretation of the eighteenth-century naturalists' "discipline of attention" as related to a natural theology understood less as argument than as a mode of cultivated experience.
108. Boyle, *Final Causes*, *WRB*, 11: 119. An example of the former is: from the use of eyes in vision to the intelligent designer and his end of furnishing the creature with such a useful organ. An example of the latter is: from the designed usefulness of the eye's vision to the structure and function of its parts.
109. *Ibid.*, 87
110. *Ibid.*, 95.
111. *Ibid.*, 145: Boyle's writing itself (an eloquent illustration) would have this effect. See also Shanahan, "Teleological Reasoning," 189–90.

112. Boyle, *Christian Virtuoso*, part 2, *WRB*, 12: 483.
113. Boyle, *Christian Virtuoso*, part 1, *WRB*, 12: 295. Cf. also Glanvill, *Philosophia Pia*, 13.
114. Boyle, *Christian Virtuoso*, part 1, *WRB*, 12: 296. Cf. also Glanvill, *Philosophia Pia*, 16, 23.
115. Boyle *Christian Virtuoso*, part 1, *WRB*, 12: 297.
116. Boyle, *Usefulness*, part 1, *WRB*, 3: 236. Cf. the same wording in “Of the Study of the Book of Nature,” *WRB*, 13: 161–62.
117. Boyle, *Usefulness*, part 1, *WRB*, 3: 270. Glanvill calls the same condition of mind “Philosophick passion” (*Vanity*, 245).
118. Boyle, *Christian Virtuoso*, part 2, *WRB*, 12: 433, 481, 490.
119. Boyle *Usefulness*, part 1, *WRB*, 3: 237. Cf. the same wording in “Of the Study of the Book of Nature,” *WRB*, 13: 156.
120. Boyle, *Excellency of Theology*, *WRB*, 8: 58–59.
121. Boyle, *Christian Virtuoso*, part 2, *WRB*, 12: 483.
122. See Ben-Chaim, *Experimental Philosophy*, 157; M. Hunter, *Boyle: Between God and Science*, 201.
123. Locke, *ELN*, essay 4, 151.
124. *Ibid.*, 153.
125. Locke, *ELN*, essay 2, 135.
126. Locke, *ELN*, essays 2, 3, and 5. For Pascal’s rejection of the metaphysical proofs for the existence of God in relation to his doctrine of disproportion, see Carraud, *Pascal*, 347–61, 393–403.
127. Locke, *Essay* IV.xii.12, 647.
128. Locke, *Essay* II.xxiii.12, 302.

CHAPTER SEVEN

1. For the search for a thorough overlap in the late Renaissance, see Blair, “Mosaic Physics”; for the transfer of hermeneutic method from biblical to natural philosophical interpretation, see Harrison, *Bible*; for the crisis in the search for at least a parallel reading of the two books in the late seventeenth century, see Mandelbrote, “Isaac Newton and Thomas Burnet.”
2. Boyle, *Resurrection* (appended to *Reason and Religion*, 1675), *WRB*, vol. 8. See Harrison, “Physico-Theology.”
3. Boyle, *Excellency of Theology*, *WRB*, 8: 44–45.
4. *Ibid.*, 47–48.
5. *Ibid.*, 50–51.
6. Locke, *Conduct* §22, 66. For Locke on the status of theology, see also Nuovo, “Introduction,” xxii.
7. Locke, *Essay* II.vii.6, 131.
8. Locke, *Essay* II.xxiii.12, 302; IV.xii.11, 646; cf. also “Knowledge A” (1676), in *Political Essays*, 251.
9. Locke, *Conduct* §22, 66–67.

10. Locke, *Paraphrase*, 2: 648; Boyle, *Style of Scriptures*, WRB, 2: 432. See Nuovo, "Introduction," xvii.
11. Locke, *Essay* IV.xviii.10, 695; IV.xix.14, 704; IV.xix.4, 698. See Nuovo, "Aspects of Stoicism," section "Reason enlarged."
12. Locke, *Paraphrase*, 1: 152–53. See Wainwright, "Introduction," 31–33.
13. Locke, *Paraphrase*, 2: 582–84.
14. Boyle, *Excellency of Theology*, WRB, 8: 32.
15. Boyle, *Appendix*, WRB, 12: 424.
16. Locke, "Of Study," in *Educational Writings*, 412.
17. *Ibid.*, 415.
18. Locke, *Essay* IV.xvii.24, 688. On Locke's views about the cognitive state of humans in the afterlife, see Nuovo, "Aspects of Stoicism," 24, and "Reflections on Locke's Platonism," 209. On Boyle's, see Osler, "Robert Boyle on Knowledge of Nature," whose emphasis on Boyle's "theological voluntarism" does not accommodate, however, the idea of the "growth" of the faculties.
19. Boyle, *Christian Virtuoso*, part 2, WRB, 12: 506. Among the motives for an individual to love God is the consideration of "the rectitude, the improvement, and the enlargement of his faculties, understanding, will, and affections," as well as of the "great discoveries" about both God's and the creatures' natures to be acquired in the afterlife (*ibid.*, 507).
20. Boyle, *Christian Virtuoso*, part 2, WRB, 12: 520; *Appendix*, WRB, 12: 425. Cf. also *Reason and Religion*, WRB, 8: 280.
21. Boyle, *Excellency of Theology*, WRB, 8: 32–33.
22. Boyle, *Christian Virtuoso*, part 2, WRB, 12: 510–20.
23. Boyle, *Appendix*, WRB, 12: 412.
24. Boyle *Christian Virtuoso*, part 2, WRB, 12: 479.
25. *Ibid.*, 474.
26. *Ibid.*, 502.
27. Boyle, *Excellency of Theology*, WRB, 8: 33.
28. Boyle, *High Veneration*, WRB, 10: 161. This is due to the "Foecundity of the Divine Nature" and to the fact that the Scriptures do not disclose the "whole Nature of God" (161–62). There are, moreover, attributes that are known by *experience* alone (e.g., his goodness, mercy, justice), as opposed to those that may be grasped by *speculation* alone (e.g., his self-existence, eternity, simplicity, and independence) (182). The "speculation" versus "experience" dichotomy surfaces here again.
29. *Ibid.*, 172.
30. *Ibid.*, 178.
31. *Ibid.*, 179.
32. *Ibid.*, 179–81.
33. Boyle, *Appendix*, WRB, 12: 413.
34. Locke, *Essay* III.vi.12, 446.
35. *Ibid.*, 447.

36. John Yolton, *Two Intellectual Worlds*, 64 and chaps. 2 and 3. Nuovo explains that, starting with Draft C, the *Essay* assumes a more marked theological framework, with large room allotted to natural theology (“Introduction,” xxv).
37. Locke, *STE* §190, 245.
38. Locke, *Essay* IV.xxi.2, 720.
39. *Adversaria* A (c. 1670), in *Political Essays*, 215.
40. *Adversaria* B (1677), in *ibid.*, 266.
41. Cf. Nuovo, “Introduction,” xxx.
42. Locke, *Conduct* §22, 66.
43. Boyle, *High Veneration*, WRB, 10: 177; cf. also 168, 172, 184–85. The notion that God’s wisdom is “manifold” is based on Ephesians 3:10 and Psalms 104:24; the angels’ desire to look into divine things, on 1 Peter 1:12.
44. Boyle, *Christian Virtuoso*, part 2, WRB, 12: 487; cf. also 449, 490, 518. See also Glanvill’s *Philosophia Pia*, which makes an explicit comparison between the student of nature and the “glorified Spirits” (141–42).
45. On Adam as representative of unspoiled encyclopedic knowledge, see Harrison, *Fall of Man*, 82 and chap. 1. In *High Veneration*, Boyle notes that angels, just like men, have a “freedom of acting”; they are thus not determined in their actions, including the “prying” and the adoration (WRB, 10: 176).
46. Locke, *Essay* IV.iii.23, 554; cf. also the “extravagant conjecture” that angels fitted with organs of sense might see into the essences of things, II.xxiii.13, 304. See the comments on this topic in John Yolton, *Two Intellectual Worlds*, chap. 3, section 2.
47. Locke, *Essay* III.vi.3, 440.
48. Locke, *Conduct* §3, 9.
49. Locke, *Essay* II.x.9, 154.
50. Locke, *Essay* II.xxiii.36, 316.
51. Locke, *Essay* II.xxi.49, 265.
52. Locke, *Essay* II.ii.3, 120. Cf. IV.iii.27, 557.
53. Locke, *Essay* II.x.9, 154.
54. Locke, *STE* §190, 245; §192, 246.
55. Locke, “Additions to the Essay,” in King, *Life and Letters*, 362. The fragment would have been added to the *Essay* chapter on the “abuse of words” (III.x.13).
56. Boyle, “Essay of the Holy Scriptures,” WRB, 13: 175–223. The “Essay” deals with many issues that will become the subject matter not only of Boyle’s later *Style of Scriptures* but also of his writings on “things above reason.” For the theological and biblical hermeneutic context of this text, see Wojcik, *Robert Boyle*, 55–58; Anstey, “Christian Virtuoso,” 19–25.
57. Milton, “Locke at Oxford,” 18–19, surveys Locke’s theological studies in the 1660s. See also Wainwright’s overview of the impressive list of sources Locke consulted in writing the *Paraphrase*, including authors from all confessional quarters (“Introduction,” 11–18, 25–28).

58. Eden, *Hermeneutics*, 58, 100.
59. *Ibid.*, chaps. 1 and 2.
60. *Ibid.*, 57, 58, and chap. 3. Eden comments that the distinction between *scriptum* and *voluntas* should not be mistaken for the distinction between the “literal” (*propria*) and the “figurative” (*translata, figurata*), which is a stylistic rather than legal distinction. The literal may very well produce a spiritual interpretation and is to be preferred over the figurative when it does (59).
61. Boyle, *Usefulness*, part 1, *WRB*, 3: 271: knowledge of both books should be applied to charity, not to “swelling” (this is an approximate quote from Bacon, *Advancement I*, *WFB*, 3: 268, with reference to 1 Corinthians 8:1); Locke, *Conduct* §22, 67.
62. Boyle, *Christian Virtuoso*, part 2, *WRB*, 12: 518.
63. On glosses in Protestant practice, see Gilmont, “Protestant Reformations and Reading.” On the (diminishing) role of the glosses in the several English editions of the Bible from 1525 to the Authorized Version of 1611, see Slight, *Managing Readers*, chap. 3.
64. Boyle, *Style of Scriptures*, *WRB*, 2: 409.
65. *Ibid.*, 393, 398.
66. *Ibid.*, 402.
67. *Ibid.*, 409–12.
68. On the division in chapters and verses of the scriptural text in the early modern period, see Stallybrass, “Books and Scrolls.” Despite the principle of a “continual course of the reading of the Scripture,” advocated in the 1549 Book of Common Prayer, the discontinuous manner of reading continued (48–51). For a history of the practice, see also Wainwright (“Introduction,” 20–21).
69. Boyle, *Style of Scriptures*, *WRB*, 2: 412.
70. *Ibid.*, 413.
71. *Ibid.*
72. Beal, “Notions in Garrison,” interprets the early modern commonplace books as personal *florilegia*. For the Protestant “spiritual commonplace book” designed to help devotional practices, see Jagodzinski, *Privacy and Print*, 40–41.
73. Boyle, *Style of Scriptures*, *WRB*, 2: 419.
74. *Ibid.*, 420.
75. *Ibid.*, 440–41. Recall the equally “concern’d” disposition of the pious student of nature.
76. The “agricultural” metaphor is often accompanied by a “digestive” one. Boyle argues for the nourishing richness of Scripture (“food for the soul”) in his answer to the objection of “barrenness.” Sharpe and Zwicker comment on the cross-fertilization of humanist and Christian metaphors in the Protestant conception of “reading and understanding as physiologies of imbibing and digesting, mastication and absorption” (“Discovering the Renaissance Reader,” 14). See also Irimia, *Rise of Modern Evaluation*, 179–201.

77. Boyle, *Style of Scriptures*, WRB, 2: 420–21.
78. An excellent discussion of Boyle's biblical hermeneutics as a parallel to his method for the interpretation of nature is in Sargent, *Diffident Naturalist*, chap. 5, who notes that the two studies need not be seen as "influencing" one another in any precise way; they are *parallel* elaborations of the same "dynamic approach to knowledge" (115).
79. In an early essay of 1661, Locke argues against the Catholic principle of the infallibility of the church on the Protestant ground that Scripture speaks for itself better than does any human interpretation. While difficulties abound, and human "blindness" is considerable, it is nevertheless possible to advance in self-instruction, at least in those areas of Scripture teaching that are meant to be observed in this life ("Essay on Infallibility," 323).
80. Locke, *Paraphrase*, 1: 181.
81. Locke, "Preface" to *Paraphrase*, 1: 104–5.
82. *Ibid.*, 112–13.
83. *Ibid.*, 110. Locke's own practice in paraphrasing the Pauline epistles (Galatians, 1 and 2 Corinthians, Romans, and Ephesians) is guided by this principle: his cross-references, explanatory notes, and summarizing synopses are aimed at unraveling the coherence of the texts. See Wainwright, "Introduction," 18–25. A good example is Locke's cross-referencing in his notes among the places relative to the "renewing of the mind" (Galatians 5:16–17, Ephesians 3:16, 4:17–24, Romans 12:2, 2 Corinthians 4:16).
84. Locke, "Preface" to *Paraphrase*, 1: 104.
85. E.g., Kuehne, "Reinventing Paul." Neither Schouls, *Imposition of Method*, who presents Locke's hermeneutics as continuous with his philosophical method nor the more historically sensitive introductions to Locke's *Paraphrase* by Wainwright or Nuovo pay any attention to this topic.
86. Locke, "Preface" to *Paraphrase*, 1: 105–7.
87. *Ibid.*, 108.
88. *Ibid.*, 110.
89. *Ibid.*, 115–16.
90. Boyle, *Style of Scriptures*, WRB, 2: 395; Locke, "Preface" to *Paraphrase*, 1: 115–16.
91. Locke, "Pacifick Christians," in *Political Essays*, 305. Locke's views seem thus to look back to what Furey has described as the "spiritual community of friends" that Erasmus and More envisioned in the late Renaissance (*Religious Republic of Letters*, chap. 1).
92. Locke, "Error," in King, *Life and Letters*, 282. Cf. also *Essay* IV.xvii.24, 688.
93. Boyle, *Excellency of Theology*, WRB, 8: 52.

CONCLUSION

1. For Boyle's use of the "lover of truth" figure, see, e.g., "Proemial Essay," WRB, 2: 27; *Things Above Reason*, WRB, 9: 373.

2. See, e.g., Glanvill's panegyric to Boyle in *Plus Ultra*, 93. Cf. M. Hunter, *Robert Boyle (1627–1691)*, 11–14.
3. M. Hunter, *Boyle: Between God and Science*, 255; *Robert Boyle (1627–1691)*.
4. Condren, *Argument and Authority*, 18.
5. Harrison, *Fall of Man*.
6. Wojcik, *Robert Boyle*.
7. Glanvill, *Philosophia Pia*, 48.
8. Harrison, *Fall of Man*, 241.
9. Shapin, *Scientific Life*, 25.
10. *Ibid.*, 32.
11. *Ibid.*, 33.
12. For the increasingly psychological and anthropological orientation of the new configurations of learning in the eighteenth century, see Vidal, *Les sciences de l'âme*; for an eighteenth-century view of the care of the embodied soul lying at the intersection of philosophy and medicine, see Zammito, "Médecin-Philosoph"; for the pedagogical thrust of Enlightenment philosophy, see Schwegman, "Etienne Bonnot de Condillac."
13. For this line of development in eighteenth-century logical thought, see Buickerood, "Natural History of the Understanding"; Winkler, "Lockean Logic."
14. Daston and Galison, *Objectivity*, chap. 1.
15. Shapin, *Social History of Truth*, 170 n. 135.
16. Roberts and Wood, *Intellectual Virtues*, 206.

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