

Opaque humors, enlightened emotions, and the transparent mind

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Imaging technologies can yield spectacular images of dimensions invisible to the ordinary gaze: of bacteria attacking cell walls; of embryos in utero sucking their thumb; of the brains of living, thinking beings. It was in the seventeenth century that images of nature became a tool of discovery and a mode of knowledge. The realms that were being newly revealed by telescopes and microscopes were a source of wonder of an artistic sort; the very capacity for humans to have access to these realms was itself deemed astonishing. But we are now far away from the time of wonder: Our visual culture has turned the normally invisible into the fully familiar.

And yet, familiarity is not the same thing as knowledge. From Plato on, epistemic doubt has thrived on an awareness of the potentially deceiving nature of visual information. An interesting opacity can lurk behind the philosophical wonder at what seems transparent, and it bears as much attention as the images we use in order to look at ourselves. Indeed, the science whose mission is to understand the structures and functions of dimensions invisible to the naked eye remains a philosophical concern, because we are its originators and interpreters. Francis Bacon once wrote that "[t]he mind of man is far from the nature of a clear and equal glass, wherein the beams of things should reflect according to their true incidence; nay, it is rather like an enchanted glass, full of superstition and imposture, if it be not delivered and reduced."¹ In his view, mental images in postlapsarian man no longer reflected Adamic knowledge and thus failed to deliver truths about the world.

Imaging technologies and theories as they are now developing serve the purpose of post-Baconian *scientia*, of knowledge. They yield dynamic maps of the universe, the world, the body, thanks to which we draw taxonomies and explore putative causal relations. In modern terms, maps—of space, of the world, of bodies, or of its own structures—need to be accurate to reveal stable, *scientific* truths; and this notion of an empirically defined, albeit hard-won and skeptically framed accuracy, was one crucial aspect of what made the "scientific revolution" of the seventeenth century revolutionary. But maps, and indeed theories, need not

be accurate to reveal truths about the *human* mode of our knowledge.

This is especially true with regard to the self-knowledge we pursue via the maps we produce of our own minds. Our ability to look inside a live, functioning brain via an fMRI (Functional Magnetic Resonance Imaging) and indeed to map it in action or to analyze it from the molecular level upward, might well consist in the exploration of the "last frontier" the brain is often described to be. But it is also posing hard questions on the status of our self-knowledge as fallible, creative, emotional beings whose lives must make sense and have value. Maps, even dynamic ones, however minutely drawn, remain necessarily at a remove from what they are charting. Bacon himself understood that. There is no knowledge without a knower and a knower's mind. And when the object of the study is also the subject of study, as is the case in the sciences of the mind, scientific knowledge seems locked within an infinitely reflective hall of Bacon's glass. But it is not an enchanted glass. At the heart of the very process of inquiring into our biological nature lies the puzzle of accommodating the objective language and objectifying methodology of science to the study of human subjectivity. An fMRI indicating areas of cerebral activity correlated with the experience of dread or disgust, much as it may help unravel their etiology, simply shows the basis for a mind-brain correlation: It does not account for the phenomenology of emotion, for what philosophers have called its "qualia."

The basis for this well-known "explanatory gap" between the biological and the phenomenal has its own history. It seems to some that, with the rapid progress in the scientific exploration of the mind and especially of emotions, we have bridged the gap and shelved the epistemological "mind-body problem" as a moot issue.²

2. For a claim by a neuroscientist that the "hard problem" of consciousness is, in fact, a moot issue, see, for instance, Gerald M. Edelman, "Naturalizing Consciousness: A Theoretical Framework," *PNAS* 100, no. 9 (April 29, 2003):5520–5524. Edelman suggests here that "the so-called hard problem is ill-posed, for it seems to be framed in the expectation that, for an observer, a theoretical construct can lead by description to the experiencing of the phenomenal quality being described. If the phenomenal part of conscious experience that constitutes its entailed distinctions is irreducible, so is the fact that physics has not explained why there is something, rather than nothing. Physics is not hindered by this ontological limit nor should the scientific understanding of consciousness be hindered by the privacy of phenomenal experience" (p. 5524).

1. Francis Bacon, *The Advancement of Learning*, ed. G. W. Kitchin (London, 1973), p. 132. Cited in Katharine Park, "Bacon's 'Enchanted Glass,'" *ISIS* 75 (1984):290–302; p. 290.

But our ability to map our emotions has actually opened a new chapter in this long-lived history. The images or maps that potentially pertain to our self-understanding are more opaque than we know, and yet this is precisely why they may reveal us to ourselves in unexpected ways. The epistemic problems posed by science today do not differ much from those faced by the great figures, from Galileo to Robert Boyle and on, who chose to follow the empirical, inductively based program of inquiry established by Bacon. We are pursuing theories about ourselves within an unknowingly opaque site; but it is a historically continuous site, whose genealogy in the early Enlightenment, as shall be explained here, may reveal the structure of our mind in a positive light.

The discipline of epistemology was born in its modern form out of the changes that took place during the seventeenth century in the realms of natural philosophy and psychology. The mind itself was famously redefined by René Descartes in the course of the first half of the 1600s as the *res cogitans* uniquely capable of “clear and simple ideas,” of abstracted inquiries into the conditions under which human knowledge was possible or true. The rational soul, a source of puzzlement and philosophical disagreement from Plato on, became a conflation of mind and soul with Descartes: that is, of ratiocinative capacities—the Greek *nous*—and of the old principle of life—the Greek *psyche*.

But the picture of the mind bequeathed in gross form to the Enlightenment and beyond is not only a Cartesian one in which reason and the passions belong to different dimensions, in which nature can be tamed by a powerful rationality. It is also a Lockean one in which sensations are the condition for knowledge and their cultivation is a condition for civilized life. The substantial entry dedicated to the passions, published in 1765 in the *Encyclopédie* of Denis Diderot and Jean Le Rond d’Alembert, begins like this:

Tendencies, inclinations, desires and aversions of some intensity [*vivacité*], along with a blurred sensation of pleasure or pain, occasioned or accompanied by some sort of irregular movement of the blood and of the animal spirits, that is what we call passions. They can eradicate all use of freedom, state in which the soul is in some way rendered passive—hence the name passions.³

3. Denis Diderot and Jean Le Rond d’Alembert, *Encyclopédie ou dictionnaire raisonné des sciences, des arts et des métiers* (Paris, 1751–1772), 17 vols., vol. 12, p. 142; and on the Web via the ARTFL Project, CNRS and the University of Chicago.

The nomenclature of passions that ensues is firmly ensconced in the sensationalism of the period. The section on “The pleasures of the mind [*esprit*] or of the imagination,” “those which provide the vision or perception of beauty in a general sense, whether the beauties of nature and art or those seized only by the eyes of the understanding,” amounts to a summary of contemporary aesthetics: Objects that provide aesthetic pleasure are those that combine “variety with order or uniformity,” [emphasis in the text]; and “the understanding finds its pleasures in the same source as do the mind and the imagination” (ibid.). The passage that follows immediately upon the first paragraph, however, is a description of the mechanism whereby passions kick into action, so to speak; and although its language is modern, it relies on an old, pre-Cartesian psychology.

Bacon himself was its earlier heir. Although he wanted to shed his Aristotelian inheritance with regard to logic and metaphysics, he did not part from the scholastic faculty psychology bequeathed by Galen, partly via the Arabic-speaking world, to the Renaissance. He still took for granted the division of the mind, broadly put, into a rational soul, a sensitive soul, and an appetitive soul, each in a continuum with the other. The faculties of cogitation, memory, common sense, and imagination were, according to this scholastic tradition, the “internal senses” of the sensitive soul. This complex picture of the mind, which still survived in the *Encyclopédie*, allowed for the integration into an organic whole of bodily functions, passions, sensations, cognition, reason, and volition. It thus made sense to assume that any methodology for the practice of natural philosophy had to account for the powers and limitations of the natural philosopher’s own mind. As Katharine Park once wrote in an article precisely on the “Enchanted Glass,” “Bacon considered imagination to be a potential tool for scientific discovery because he believed that the universe itself was structured by real correspondences and similitudes.”⁴ He was, she went on, “convinced that the unity of nature and the true causal explanations for natural phenomena were located in a realm inaccessible to sense” (ibid.:294), and so the natural philosopher’s task “was to move from visible phenomena to invisible physical mechanisms” (ibid.:295). The imagination could be harnessed to do just that.

The imagination had in fact always been harnessed to do that. Before the Baconian scientific enterprise and the accompanying philosophical shifts, it had tended to

4. Park (see note 1), p. 294.

move from visible phenomena to invisible mechanisms without an adequate theory of causality, stuck within the teleological conception of biological function promoted by Galen. It was the imagination that had given rise to the theory of humors, one of the most long-lived theories of mental and bodily functioning, which arguably blocked the evolution of medicine for close to two millennia. From early Greek antiquity to early modernity and beyond, humors, or fluids—black bile, choler, blood, phlegm—were deemed to circulate within the organism, underlaying all pharmacopoeia, diagnosis, treatment, and nosology, and accounting for our temperaments, moods, character, and states of health and illness. Within Galenic humoral theory, emotions were posited in terms of physiological events. It was not clear whether they were products, equivalents, or correlates of each other, or what of which; nor did such questions arise. Although he was philosophically astute and well-schooled in Aristotelian reasoning, Galen might not have understood why an fMRI might yield philosophical perplexity: The mind-body problem was not his problem.

In the West, the theory of humors originally arose in Greece in the fifth-century B.C., along with Hippocratic rationalist medicine and alongside Socratic thought. Galen adopted it in the second century A.D., and his synthesis of Plato, Aristotle, and the Hippocratic corpus would survive throughout the centuries. It was the medical and psychological norm in the Arabic and Western medieval worlds, was commonplace during the Renaissance, and would meet its theoretical demise when, in the 1620s, William Harvey worked out the circulation of the blood empirically. Harvey's momentous achievement was a culmination of the process that had begun with the revision by Renaissance anatomists, especially Andreas Vesalius, on the basis of human dissections, of entrenched, sacrosanct Galenic beliefs regarding anatomy. These revisions displaced the model according to which food turned into chyle in the liver, from where, thanks to the heat produced by these digestive concoctions, the vital spirits in the blood were expedited to the heart and from there, to the brain. The cerebellum supposedly refined some of these spirits into smaller, animal spirits that were more nimble still. Heat and cold, dryness and moistness, crucially affected the course of these spirits; and the effects of the humors themselves on mood, thought, and health changed according to the degree of heat, agitation, and moisture present in the organism. And so, once Harvey had shown that blood actually circulated through a heart that functioned as a pump—replacing one

hydraulic model with another—it was difficult to hold on to this picture.

However, medical practice continued to rely on the theory of humors at least until the nineteenth century, and, as I argue in a forthcoming book on the subject, its very generality made it easy to recycle. In its original form, it was medically misguided, relying on scant anatomical information at first and later surviving on the back of the inability to bridge anatomical knowledge and physiology. It offered an opaque map in lieu of experimental study, and the brutal bleedings and purges that it justified often finished off patients where illness had not done so. But it was metaphorically accurate especially in psychological terms, and its perdurance as a linguistic construct—we all know what is an episode of black bile, a choleric temperament, a phlegmatic reaction, or a sanguine attitude—testifies to the success of a particular, albeit opaque, way of rationally representing our physiological selves to our thinking, theorizing, emotional minds. Certainly the very capacity to categorize and map our mental states partakes of a rational faculty, not of a humoral organism, and Descartes's radical version of substance dualism did, in some ways, unravel the metaphysical basis on which this psychology had stood. His physical and psychological doctrine was itself, after all, a product of the constraints of the new physics he sought to construct on the ground of the Aristotelianism that Galileo and indeed Bacon had already declared untenable. But even Descartes could not do without the causal relation between emoted perception and physiology; nor did blood circulation undermine it.

The compost of traditions that informed Renaissance psychology broadly include Aristotelianism, Stoicism, Galenicism—specifically the Galen who, in his treatise on the passions, *The Passions and Errors of the Soul*, revised Plato's *Timaeus* for his purposes—and Thomism. It was St. Thomas Aquinas who had defined concupiscibility as the tendency to seek good, or tempting, or beautiful, or desirable things and to avoid bad, or repugnant, or ugly, or dangerous things; and irascibility as the tendency to fight whatever might block our way to obtaining a good or fleeing an evil. The concupiscible part of the soul was activated when one experienced desire or aversion (and all the emotions in between), and the irascible one was activated when one experienced the hope of obtaining something or the anger of losing it, and all the emotions in between. The "desire" and "fear" mentioned by the author of the *Encyclopédie* entry are equivalent categories, emotional states which, defined as they are by the basic polarity of

pleasure and pain, encompass most of the other emotions and allow one to index them according to motivation, action, and reaction. The binary structure of these basic states, in any case, accounts for emotionally framed conflicts and explains why we might be capable, or incapable, of judging situations and acting according to our judgments: It allows both for justification and for *akrasia*.

This is so, because within the structure of faculty psychology, which is varied but generalizable and here specifically was described according to the Galenic model, the three souls of humans were connected to one another and therefore influenced each other. The sight of a beautiful girl, for example, modulated by the Aristotelian corporeal soul (the equivalent of the irascible power, lodged in the heart), could activate the appetitive soul (the equivalent of the concupiscible power, which is lodged in the liver). The same stimulus bearing upon the rational soul would result in a different reaction to the desire provoked by the beautiful sight and induce the will either to act on it or to control it. This interconnection explained why we were aware of our passions and emotional conflicts, and inversely, why our thought processes were sometimes troubled by the activity of the sensitive soul, thanks to which we were also aware of our sense perceptions. The vital spirits would be refined by the cerebellum into the smaller "animal spirits," themselves responsible for the transmission of sense perceptions to the *sensus communis*—the seat of common sense, separate from ratiocination and volition, but connected to these most developed of faculties.

If psychology and medical practice lagged behind anatomical change, this was not necessarily for bad reasons. The humors were a relatively sophisticated, convenient schema, which relied on the notion that the mind was an integrated component of the body, and with the help of which an extensive set of medical cures had been developed. Robert Burton's *The Anatomy of Melancholy* is a many-sided book, but it is nominally about melancholy, an illness of body and soul and "the greatest of all" passions. Burton was Harvey's contemporary, but he still could write—albeit with the rhetoric and critical distance of a historian of ideas—that:

A most frequent and ordinary cause of melancholy, *fulmen perturbationum* (Piccolomineus calls it),⁵ this thunder and

5. Piccolomineus is Francesco Piccolomini, a sixteenth-century philosopher who espoused both Platonism and Aristotelianism. (Not to be confused with the earlier Cardinal Francesco Piccolomini Todeschini, the nephew of Enea Silvio Piccolomini—Pope Pius II—

lightning of perturbation, which causeth such violent and speedy alterations in this our microcosm, and many times subverts the good estate and temperature of it. For as the body works upon the mind by his bad humours, troubling the spirits, sending gross fumes into the brain, and so per consequens disturbing the soul, and all the faculties of it, *Corpus onustum / Hesternis vitiis animum quoque praegravat una*, [By yesterday's excesses still oppressed, / The body suffers not the mind to rest,] with fear, sorrow, etc., which are ordinary symptoms of this disease: so, on the other side, the mind most effectually works upon the body, producing by his passions and perturbations miraculous alterations, as melancholy, despair, cruel diseases, and sometimes death itself; insomuch that it is most true which Plato saith in his *Charmides*, *omnia corporis mala ab anima procedere*, all the mischiefs of the body proceed from the soul.⁶

The presumption of constant, intimate mind-body interaction explained the workings of the passions, the vagaries of mental and physical health, the mechanism of perception, dreams, and most of our myths and narratives. While the metaphysics of substance and motion were revolutionizing physics—and vice versa—the life sciences barely followed suit. Mid-seventeenth-century texts of moral psychology tended to rely on, rather than to be concerned with, the physiology of the passions their readers were supposed to understand, and they continued to function as numerous guides to behavior of (what we would call) a sociological bent, usually divided into sections on ethics, politics, and economics.

Such is the case of one treatise written by the statesman, magistrate, Pyrrhonist, and scholar François de La Mothe Le Vayer (1588–1672), for example. La Mothe was also a tutor to the brother of Louis XIV, the Duc d'Anjou (later Duc d'Orléans), and it was in that capacity that he wrote *De l'instruction de Monseigneur le Dauphin*.⁷ In the section devoted to "La morale du Prince," he argued that there was a fundamental difference between "moral action and human action" (ibid.:242). Moral actions depended on the presence of

who commissioned Pinturicchio to paint the library in the Siena Cathedral and who became Pope Pius III before dying a month later.)

6. Robert Burton, *The Anatomy of Melancholy* (Oxford, 1628; reprint New York: New York Review Books Classics, 2001), vol. 1, pt. 2, sec. 3, ch. 1, p. 250.

7. First published in 1653, with a dedication to the Cardinal Mazarin. See François de La Mothe le Vayer, *Œuvres* (Dresden, 1761; based on the 1699 edition), vol. 1, pt. 2: *Sciences dont la Connoissance peut devenir utile à un Prince*; pt. 3: *La Morale du Prince*.

the will and of the understanding—*entendement*—which was necessary to the will (ibid.:241). Human actions either were those performed under constraint; by “madmen, little children, and sleepers”; or were indifferent gestures, which “tended neither to vice, nor to virtue,” those which “make you hop with joy, wander without a purpose, pick up a wisp of turf or brush up our moustache” (ibid.:242–243). This ethic was based on a Thomistic voluntarism, which guided at once conduct and deliberation about conduct.

La Mothe, true to this tradition, identified two appetites (a variation on the trio): one rational, dependent on the will; and one sensitive, pertaining to beasts as well as passions. The sensitive appetite, in turn, was either concupiscible and led us to seek out the good and flee the bad, or irascible, which reacted to the difficulties that resulted from the attractions or repulsions of the concupiscible appetite (ibid.:244). The functions of the rational appetite or soul differed from those of the sensitive appetite or soul, insofar as they pertained to cogitation, imagination, and memory: Reason was thus necessary to the existence of a moral sense, which, in turn, was central to this picture of mental organization. Actions, whether good or bad, were excited by passions, and so, in order to understand actions, one had first to consider passions that, wrote La Mothe, were “named perturbations by the Latin philosophers, and indeed they are natural emotions, which take place in the sensitive part [of the soul], where they are based” (ibid.). Moral responsibility, therefore, depended on awareness mediated by reason, which, in turn, had a cognitive impact on the other appetites. Moral soundness was gauged in terms of a cognitive continuum, so to speak, between emoted experience and the mediated experience of taking stock, of finding an adequate justification for action by appeal not to rules but to our own ability to embrace emotions as instruments.

It is important to see Descartes and his Enlightenment heirs in the light of this sophisticated tradition. Descartes was less Cartesian than the Cartesians. The reason whose realm he defined within the *cogito* did not in fact have the high ground within the realm of ethics, even though, as he famously stated in the preface to the *Principes de la philosophie*, he believed ethics to be, along with medicine and mechanics, the topmost branch of the tree of philosophy, whose roots were metaphysics, and whose trunk was physics. The only ethical system he ever attempted to build—specifically in the *Passions de l'âme* and also in his correspondence,

especially with the Bohemian Princess Elisabeth exiled in the Hague—relied on a physiology which actually acknowledged the necessary interplay of body and mind. This is quite significant, since he believed that virtue was the highest good in life and that it was the duty of ethics to define both what this virtue was and the means, *given* our dual nature, to attain and live by it.⁸

Understanding the etiology of passions was crucial to the attainment of virtue, since, as he wrote, “experience shows that those most agitated by their passions are not those who know them best, and that they [these passions] are among those perceptions which are confused and obscured by the narrow union of soul and body.”⁹ And to understand the passions, it was crucial to stand corrected with regard to our own self-perception as embodied beings.

Yet—and this, too, matters in the light of our current association of a newly reestablished monism with the embodiment of emotions and a putative end to the mind-body problem—Descartes described the physical nexus of emotional life by identifying knowable emotional events with knowable physiological ones. As he explained at length in *L'homme* and in the *Passions de l'âme*, throughout our lives, animal spirits remained the components underlying the physiology of emotion, because they were endowed with the lightness and vivaciousness which enabled them to travel speedily towards the brain through arteries from the heart, and in turn, from the heart to the brain via the veins. Of course, they produced passions independently of the will's command, but this meant that the body had rules of its own that medicine, specifically, could reveal and act upon. However powerful his rejection of both Aristotelian and Galenic finalism, Descartes was able to recycle the traditional somatic theories for the sake of the achievement of the ultimate aim of medicine, that of “healing, alleviating suffering, and extending life.”¹⁰

The association of passion with illness had always supposed a hierarchical view of the soul, and this continued to be the case with Descartes, simply because such a view helped make sense of the dependence of

8. See René Descartes, “A la Sérénissime Princesse Elisabeth” in *Descartes: Œuvres philosophiques*, ed. Ferdinand Alquié (Paris, 1988), vol. 3: *Principes*, pp. 87–88; “A Elizabeth,” June 28, 1648, in vol. 3, p. 48: “[J]e crois qu'il est très nécessaire d'avoir bien compris, une fois en sa vie, les principes de la métaphysique, à cause que ce sont eux qui nous donnent la connaissance de Dieu et de notre âme.”

9. Descartes, *Passions*, ibid., vol. 3, p. 974.

10. See Steven Shapin, “Descartes the Doctor: Rationalism and Its Therapies,” *British Journal of the History of Science* 33 (2000):131–154; p. 133.

normative ethics on somatic theory. Our self-description as moral creatures rested on the acknowledgment that reason and physiologically mediated emotion were intimately, humorally connected. Descartes wanted to turn emotional cognition into a disembodied activity, but he actually threw it back, complete with its animal spirits, into the old system bequeathed by Galen, whenever he broached ethical discourse. In spite of himself, he was unable to divorce medicine from ethics. The very process of formulating how physical and moral beings could regulate their behavior so as to accommodate needs and duties to each other relied on a view of the rational soul as participating in the activities of the appetitive and sensitive souls and vice versa. Moral action entailed knowledge of causal relations, and knowledge of causal relations depended on ratiocination, on the *entendement*, which, in turn, could bear on our emotional states.

But Descartes also wanted to show that all of this activity, which remained intact within his system, was only mechanical, that consciousness was a function of the immaterial soul. Animal spirits incarnated, literally, the materiality of emotion and sensation, their reducibility to mobile particles. Without the *res cogitans*, we were merely well-designed organisms, unaware, incapable of experiencing, conceiving, remembering, emoting meaningfully; without it, there was only brute sensation and crude perception, of the sort that animals had, creatures now deprived of a soul by the Cartesian blow to the great chain of being between all living things. Decartes's mainly tactical denial of a soul to animals is a crucial chapter in the history of materialism: The debates and controversies it ignited posed with urgency the problems begotten by the abolishment of scholastic physics. Pierre Bayle argued later that to posit that materialism was true for humans was to reduce man "to the condition of a machine, whence it follows that the human race is not distinct from the body, but is only a reconstruction, a mechanical disposition of several parts of matter."¹¹ Arguably, our capacity for self-perception—our consciousness—precludes the reality of mechanism as anything but a thought experiment: The notion of a man-machine, refined in the eighteenth century by Julien Offray de La Mettrie, can only be abhorrent. This is partly why the revolution in physics, which took place during the seventeenth century, was not matched by a revolution in biology, medicine, and

psychology. More powerful than the need for *scientia* were the abhorrence inherent in a vision of a mechanical human being and the need to hold on to a divine creator, a first cause, and even a final cause—the Aristotelian teleology that Galen had integrated within his analyses of anatomy and physiology.

Descartes's most noteworthy legacy to the later Enlightenment consisted in his relying on the accessibility to the conscious mind of the phenomena of sense, including emotion, in order to turn self-consciousness into the proof of dualism. This was the novelty of the *cogito*: We were aware of mind-body duality thanks to the operations of the very reason which discovered its nature. And once he had turned all consciousness, including that of emotion, into a feature of the disembodied soul, emotions themselves could seem mechanized, analyzable by a rational scientific mind—whether by the ordinary emoting person, or by the natural philosopher. The resulting "man-machine" quickly became a bogeyman, while atheism was easily imputed to those philosophers, most notably Thomas Hobbes and, in a league of his own, Baruch Spinoza, who wanted to show that the emotions—the internal world of the human subject—could be described in the same terms as those used to describe the physical world and our sense-mediated access to it.¹² But at least until David Hume and the possibility of atheism in the eighteenth century, the rationally devised, philosophical accounts of emotion ensured a neat separation of their functions and a preservation of the rational soul as the guarantor of a moral order.

The Cartesian view of consciousness can seem intuitively, phenomenally valid: Our self-conscious reason, capable of appraising humoral passions, seems "above," higher than them. It is the same reason that can appraise the image of the brain, objectifying itself at will; and it is the same reason that creates scientific theories. But this is also why the new science of emotions—as young as is ancient the art of observing them—is faced with the interpretive difficulties faced by all mind sciences and by all attempts at understanding function on the basis of anatomically mapped structure.

11. Pierre Bayle, *Dictionnaire historique et critique* (Amsterdam, 1697), s.v. "Dicaearchus."

12. Thomas Hobbes, *Leviathan, or the Matter, Forme, & Power of a Common-Wealth, Ecclesiasticall and Civill* (London, 1651), ed. C. B. Macpherson (London, 1981), vol. 1, p. 1: "sense in all cases is nothing else but original fancy caused (as I have said) by the pressure that is, by the motion of external things upon our eyes, ears, and other organs, thereunto ordained"; and vol. 1, p. 6: "That sense is motion in the organs and interior parts of man's body, caused by the action of the things we see, hear, etc., and that fancy is but the relics of the same motion, remaining after sense."

Indeed, naturalistic accounts of emotion, passed on from antiquity, posed and, as we have seen, failed to resolve the question of the status of the new science with regard to the morally perplexed, emotional, embodied, humoral but socialized human being. The unease generated today by the expulsion of teleology from the biological analysis of mind, emotion, and consciousness is not very different from the early modern distrust of naturalism and atheism.

We are the direct heirs of early modern naturalism, whose initial, hiccuppy rise in the seventeenth century in the form of mechanism, corpuscularianism, hylozoism, and vitalism (held in particular by the physician and chemist Georg Ernst Stahl and his followers) was accompanied by the metaphysical, epistemological, and ethical uncertainties that resulted from squeezing Galenic and Aristotelian teleology out of biology. Without teleology, it was tempting to mix and match old souls and new bodies, as did the physician and first “neurologist” Thomas Willis, following the Gassendist trend of re-injecting vitalism into the machine of the body.¹³ Animal spirits in the *sensus communis* continued to play a central role for Willis, who nevertheless differentiated their respective role in the cerebrum and in the cerebellum, as well as in the etiology and nosology of madness, identifying specific mental disturbances with disturbances in the brain.¹⁴ By the late seventeenth century, psychiatry began to turn on nerves, but the soul remained a “fiery substance” in the blood. Senses were the passions of the soul, while motions were its actions, and both involved movements of the animal spirits, the soul’s “constitutive Particles, being moved somewhere in the System of the Nerves.”¹⁵ The scheme of inner and outer senses remained. One Thomas Tryon (1634–1703), a “student of physick, writer, merchant,” explicitly rejected Galen’s all-too-neat “Principle” of the four humors as “Forms and Words, rather than Realities,” while concluding that “most Diseases arise, either from Irregular passions of the Mind, or poysonous ferments, occasioned by ill Dyet, or improper Physick of the Body.” It was the case, wrote Tryon, that:

Madness and Phrensie do generally . . . arise and proceed from various Passions and extream Inclinations, Love, Hate, Grief, Covetousness, Dispair, and the like, which do . . . break forth, violate and destroy the five inward Senses of the Soul, whence the outward Senses do arise; So that the Soul loseth its distinguishing property, and then the Imaginative property and Soul’s Power becomes rampant, unbounded, or as it were without a Guide, and consequently such a Soul is unchain’d, or set at liberty from the dark Confinements of the grosser Senses and Reason, even as men in Dreams . . .¹⁶

Faced with a mind that had lost its cognitive grasp, the philosopher, who would normally tease out how moral distinctions could be objectively grounded within a civil society, turned into a psychiatrist. This indicates just what is at stake when a doctor faces a patient like the one described by Tryon. Treatises on the passions had been first and foremost guides to moral psychology that allowed for the cognitive role of emotions but did not require an etiology for moral prescriptions to make persuasive sense. As the eighteenth century progressed, however, mechanistic and sensationalist accounts of the passions were available that also emphasized their intentionality. Under the entry *sens interne* (internal sense), the *Encyclopédie* gives a definition of passions as:

. . . such affections that impress such profound traces on the brain that its whole economy is subverted, and no longer knows the laws of reason. It is a violent state that pulls us towards its object. Passions include 1) the representation of the thing outside us; 2) the idea that results from it and accompanies it, and gives birth to the affection of the soul; 3) the movement of the spirits or their suspension registers its effects.¹⁷

The very possibility of being overtaken by a passion, its force clouding over reason and moral sense, might indicate that Hume was wrong to assume that “thought and understanding” were incapable of “fixing the boundaries of right and wrong”¹⁸ on the basis either of rationalizable demonstration, of a natural relation of fitness, or of a *priori* causal order. But what we may presume to constitute cognitive content is not

13. On Thomas Willis, see Carl Zimmer, *Soul Made Flesh: Thomas Willis, The English Civil War and the Mapping of the Mind* (London, 2004).

14. Thomas Willis, *Cerebri Anatome* (London, 1642), trans. by Samuel Pordage, as *The Anatomy of the Brain and the Description of the Use of the Nerves* (London, 1681).

15. Willis, *The Anatomy of the Brain* (see note 14), p. 95.

16. Thomas Tryon, *A treatise of dreams & visions . . . To which is added, a discourse of the causes, natures and cure of the phrensie, madness or distraction*. By Philotheus Physiologus (London, 1689), as quoted in Richard Hunter and Ida Macalpine, *Three Hundred Years of Psychiatry, 1535–1860* (Oxford, 1963), pp. 233–235; in particular pp. 233–234.

17. *Encyclopédie* (see note 3), vol. 15, s.v. “Sens internes.”

18. David Hume, *A Treatise of Human Nature* (London, 1739–1740), ed. D. F. Norton & M. J. Norton (Oxford, 2000), pt. 3, vol. 1, ch. 1, p. 29 and passim.

necessarily fixed by reason, especially if our emotions really do provide us with a cognitive hold on the world, and if our judgments of value rely on this content.¹⁹ The puzzle begins when we realize that naturalized biological accounts of emotions—evolutionary, modular, or neurophysiological—are value-free, or opaque, so to speak, from an ethical point of view.

Our position within the hall of glass that is our rational mind contemplating its capacity to feel and to value is a difficult one. The severity of this difficulty emerges most acutely when the ordinary mind breaks apart and turns into that of Tryon's patient—when a manic-depressive crisis hits, or when a twenty-year-old son becomes schizophrenic. Psychiatric cases can become easy to categorize when they are extreme, and in some cases their categorical clarity is what makes them empirically treatable. Where humoralists had mania, we have bipolar conditions, for instance. It is also true that where they saw a difference between the broadly defined state of melancholy and the specific actions of the black bile always associated with it, we have conflated the two into depression.

But melancholy is a special case, with its own cultural history, and the line of explanatory opacity actually stretches on from antiquity to today, unbroken. The very existence of efficient psychiatric care may even rely on this opacity. The difference between intuitive self-knowledge and an expert medical diagnosis can be as unclear as that between the normal and the pathological, because any claim to properly psychiatric knowledge relies on an *a posteriori* definition of pathology, empirically derived and based on case studies and ordered categories devised by the social and medical world outside the body and outside the patient's mind (found, for example, in the *DSM—Diagnostic and Statistical Manual of Mental Disorders*—manuals. Martha Nussbaum suggests that “seeing them [emotions] as in every case taking place in a living body does not give us reason to reduce their intentional/cognitive components to nonintentional bodily movements.”²⁰ If

this is true, a valid scientific account of emotions changes little for us, the objectified subjects of our own studies. We can be both monists and naturalists with regard to our emotions, but it is hard to reconcile either position with the sense of value that enables us to see the brain on the computer screen as an actual mind, rather than as a grey mass. We may adopt a “view from nowhere,” a meta-anthropological view, so to speak, with regard to the human sense of value, and leave each realm separate. But even so, the view from nowhere is precisely what allows us to study the human object without trying to resolve its relation to the valuing subject.

Our neurosciences and imaging technologies are forcing us to revise the intuitively powerful dualism that made it impossible for Descartes to account for conscious emotion in terms of humoral physiology. We no longer can conceive of reason as partaking of a higher plane (or immortal soul), just as our technological tools are allowing us to “see” inside our active, emoting brains, showing us how cognitive our emotions can be, how emotional our reasoning faculty really is. This is why we think that the mind-body problem is not ours either any more than it was Galen's. Descartes himself did not cancel out the need to associate in some way the cognitive nature of emotion—confirmed by the neurosciences themselves—with its physical manifestation. But neither did he cancel out the need to ground the sense of value within a set of norms defined by the mind's ability to think itself beyond the interplay between mind and body, reason and emotion. The new sciences of the human mind continue to pose questions to the objects of their study that seem to lie without their reach: Opacity, whether in its humoral or in its modern guise, remains at the very center of the newly visible brain and of our physiological accounts of moral or aesthetic response. For we tend to forget that there is no science without scientists, no universe or mind to study without the human mind. By shedding light on the psychology of the psychologist, on the Baconian mind, we end up breaking through the looking glass—only to realize that we are looking at our own reflection.

19. See, notably, Ronald de Sousa, *The Rationality of Emotion* (Cambridge, Mass., 1987); Joseph LeDoux, *The Emotional Brain: The Mysterious Underpinnings of Emotional Life* (New York, 1996); Antonio Damasio, *Descartes's Error: Emotion, Reason and the Human Brain* (New York, 1994) and *The Feeling of What Happens: Body, Emotion and the Making of Consciousness* (New York, 1999); Dylan Evans, *Emotion: The Science of Sentiment* (Oxford, 2001); Martha Nussbaum, *Upheavals of Thought: The Intelligence of Emotions* (Cambridge, U.K., 2001).

20. Nussbaum (*ibid.*), p. 25.