Descartes Re-Imagined: Ingenuity Before and Beyond Dualism

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René Descartes looms large in the canonical narratives of rationalist modernity, whether in European intellectual history, in the cultural history of the French *Âge classique*, or in the history of the so called 'Scientific Revolution'. Cartesian dualism, this ontological split of the human being into the two incommensurable substances of the unextended mind and the extended material body, is absolutely central to these narratives and their current scholarly critiques. This volume does *not* tackle the *philosophical* problem of dualism and mind-body union as it is currently envisaged and reassessed in analytical philosophy.[1] Our purpose here is to focus on the notion of *ingenium* as an important *historical* backdrop to, and *historical* perspective on, Descartes' works, which afford other (pedagogical, mathematical, and cultural, rather than metaphysical or ontological) readings of the Cartesian project and legacy–hence 'before' and 'beyond'.

This volume thus envisages Descartes's philosophy from the perspective of the *ingenium*, or as Norman Kemp Smith puts it and Dennis Sepper reminds us in his chapter, 'total mind-body equipment'.[2] In period terms, the *ingenium* was one's individual, inborn nature, that is, the temperamental and cognitive specificities of one's *embodied* mind. Descartes himself provides a precise, technical definition of the *ingenium* in his *Regulae ad directionem ingenii*: The ingenium is the specific name given to the "the power to know …. when it forms new ideas in the corporeal imagination (*phantasia*), or concentrates on those already formed".[3] Cartesianism therefore also involved a philosophical definition of ingenuity as embodied 'thinking with images' (the *ingenium*).

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[1]. For recent philosophical studies on mind-body relation in Descartes, see e.g. Lilli Alanen, "Descartes' Mind-Body Composites, Psychology and Naturalism," *Inquiry–An Interdisciplinary Journal of* Philosophy, 51, no. 5 (2008), 464-84, Denis Des Chene, *Spirits and Clocks: Machine and Organism in Descartes* (Ithaca: Cornell University Press, 2001), Helen Hattab, *Descartes on Forms and Mechanisms* (Cambridge 2009), Dan Kaufmann, "Descartes on Composites, Incomplete Substances, and Kinds of Unity," *Archiv für Geschichte der Philosophie* 90, no 1 (2008), 39-73, Geneviève Rodis-Lewis, *L'anthropologe cartésienne* (Paris: Presses Universitaires de France 1990), Tad M. Schmaltz, "Descartes and Malebranche on Mind and Mind-Body Union," *Philosophical Review* 101, no 2 (1992), 281-325, Stephen Voss, "Descartes: The End of Anthropology," in *Reason, Will and Sensation*, ed. by John Cottingham (Oxford: Clarendon 1994), 273-306.

[2] Norman Kemp Smith, *New Studies in the Philosophy of Descartes: Descartes as Pioneer* (London: Macmillan, 1952), pp. 151 and 160, mentioned by Sepper below, pp. xx.

[3] AT X, pp. 416; CSM 1, p. 42.

The first part, 'Rethinking the *ingenium*', outlines the multifarious forms taken by Cartesianism envisaged as a philosophy of ingenuity. Thus reading Descartes as a philosopher of early modern ingenuity means, for Denis Sepper, highlighting his lasting anthropological and ethical outlook on human beings as creaturely wholes rather than as mind-body philosophical constructs; for Harold Cook, it means retracing Descartes's life-long medical investigations of the soul's embodiment in the motions of human beings, those passionate animals geared towards the good life and quite distinct from the mind-governed automata of mechanistic physics. For Denis Kambouchner, apprehending Descartes as the philosopher of the early modern *ingenium* rather than as the founding father of the modern subject means reinterpreting Cartesian method as the practical cultivation of one's wit rather than as a theory of knowledge. Indeed, for Descartes, the *ingenium* as the site of embodied cognition could be trained or exercised. Envisaged from the perspective of the *ingenium*, the Cartesian method is no longer a set of abstract norms, but a sort of 'how-to' guide to good thinking. By calling into question the identification of the method with a well-defined set of precise rules, Denis Kambouchner challenges the scholarly consensus on the method which had written it off as scientifically unproductive. The method, he argues, was an *ars* receiving each time a different content from the specific problems to which it was applied. For Roger Ariew, this new art of thinking amounts to a new logic; one of its central and, as it turns out, most problematic operations was enumeration, as Theo Verbeek makes clear in this volume.

The second part of this volume, 'The Cartesian *ingenium* in context' embeds those Cartesian views within a *longue durée* history of ingenuity. This history arches back to classical rhetoric and medieval scholastic discussed by Igor Agostini; it also involves locating Descartes within a Renaissance pedagogical tradition surveyed by Richard Oosterhoff; I, for my part focus particularly on the Jesuit pedagogical heritage at stake in Descartes's view on the *ingenium*. This *longue durée* history is inextricably tied to the question of sociability in the seventeenth-century. The networks of the Republic of Letters are central to the problem of ingenuity and politeness which I discuss, while Alexander Marr's postface sheds lights on the artistic academies and virtuosi circles so fond of ingenuity in which Descartes belonged in the 1620s. Not only does ingenuity define modes of sociability: it was central to Spinoza's analysis of the identity of a people which determined their theological and political choices, as Daniel Garber's contribution makes clear.

The concept of the *ingenium* is not only central to Descartes's youthful and unfinished *Regulae ad directionem ingenii* (circa 1628); the notion recurs throughout his writings–in the *Meditationes*, and in the correspondence. For Descartes, the main site for the practice and discipline of embodied cognition was the corporeal imagination. Indeed, Descartes's technical definition of the *ingenium* identifies it with the power to discover and invent thanks to mental images.[4] In this volume, we contend that rather than advocating the rationalist primacy of the intellect anchored in dualism, Cartesian philosophy demonstrates a deep awareness of the importance of the imagination in particular, and of embodied cognition in general, for both scientific endeavours and ethical ones. True, Descartes did champion clear and distinct ideas connected into analytical 'chains of reasons', yet it is significant that he often chose to cast these into the imaginative frames of fables and analogies, or in diagrammatic and schematic images. While he heralded the rationalist universality of good sense (*le bon sens ou la raison*), such universalism might well have reflected his ideal of interpersonal exchanges rather than his experience of them.[5] Whether through appeals to rhetoric or through communication breakdowns, Descartes's correspondence displays a clear and sometimes painful sense of the variety of *ingenia*, of the diversity of wits: a point whose social and ethical implications Garrod touches upon in this volume, and whose political consequences Daniel Garber has teased out in the post-Cartesian philosophy of Spinoza. In this respect, this volume criticizes the grand rationalist narrative of modernity which constitutes the frame of reference of Cartesian historiography, by asking for Cartesian dualism, one of the tenets on which this frame of reference rests, to be reassessed in intellectual history, in the cultural history of French classicism, finally in the history of science.

I. Reassessing Dualism: Cartesian Ingenuity and Intellectual History

In the grand narrative of intellectual history, Descartes was resolutely modern because his philosophy heralded a new understanding of the self as pure, reflexive consciousness or mind incommensurable with the body. The radical and primary

[4] Several contributions in this volume explore the period meanings of *ingenium* and their relevance to Cartesianism: see Agostini, Ariew, Garrod, and Verbeek. For a European map of these meanings in period dictionaries, see Alexander Marr, Raphaële Garrod, José Ramòn Marcaída and Richard J. Oosterhoff, *Logodaedalus: Word Histories of Ingenuity in Early Modern Europe* (Pittsburg: Pittsburg University Press, 2018). The technical definition of the *ingenium* features in the *Regulae ad directionem ingenii*: see AT X, p. 416; CSM 1, p. 42.

[5] Incipit of the *Discours de la méthode*: AT VI, p.1, CSM 1, p. 111.

discovery of the *cogito*–the intuition of 'I am, I exist' which puts an end to hyperbolic doubt in the second of the *Meditationes*–and the introspective analysis that follows it define the subject as a reflexive 'thinking substance' whose cognitive operations encompass all the functions which were formerly distributed between various faculties of the soul and even various souls in scholastic faculty psychology.[6] Thus for scholasticism the intellect and the will were distinct faculties of the rational soul, whereas sensation, memory and the imagination were primarily faculties of the sensitive or animal soul. With Descartes, these cognitive operations become different modes of thoughts of the same mind.[7] The philosophical outcome of this shift from a psychological conception of the human being as a complex system of various souls to one which foregrounds a unified account of mind is momentous. The concept of scholastic souls accounted for human beings in general and rationality in particular within a natural-philosophical framework focused on nature as embodied life: within a hierarchy of living and dying beings, human life tended towards the actualisation of one's rationality, because one's rational soul was the form of one's body. For Descartes, the thinking 'I' is posited as the first, indubitable clear and distinct idea long before doubt about the existence of the body has been lifted: human beings are first and foremost individual consciousnesses distinct from their bodies.[8]

As a result of this dualist redefinition of man, the question of mind-body relations, and in particular the status of the imagination as the prime location of cognitive mind-body interaction became one of the philosophical *cruces* of Cartesianism. Descartes located the organic imagination (*phantasia*) in the pineal gland in the brain: sensations generated either by external bodies or by one's own were carried by the 'animal spirits' to the pineal gland, where they left an imprint that the mind could manipulate in all sorts of cognitive processes by 'applying itself to it'.[9] For the history of philosophy, the vagueness of this 'application' is one of Descartes's most striking shortcomings: how could the immaterial substance of the mind 'apply itself' to the

[6] See Katherine Park, "The Organic Soul," in *The Cambridge History of Renaissance Philosophy*, ed. C.B. Schmitt, Q. Skinner, E. Kessler and J. Kraye (Cambridge: Cambridge University Press, 1988), pp. 464-84. This philosophical consensus on the soul or rather souls and their faculty also features in the textbooks from his La Flèche years that Descartes mentions in his letter to Mersenne of 30 September 1640: Toletus, the Conimbricenses and Eustachius, whose name he cannot remember (AT III, p. 185; CSMK, p. 153). See Eustachius A Sancto Paulo, *Summa philosophiae quadripartita–Physica* (Paris, 1609), pp. 254-442.

[7] See Meditation 2, AT VII, p. 28-9, CSM 2, pp. 19-20.

[8] See Meditation 2, AT VII, pp. 29-30, CSM 2, p. 20.

[9] On the workings of the pineal gland, see *Traité de l'homme,* AT XI, pp. 174-78; CSM 1, pp. 104–7.

extended matter of the pineal gland? Intellectual historians and philosophers alike have therefore often deemed Descartes's account of the workings of the imagination in the *Regulae* and the *Traité de l'homme*, as well as his description of its role in the *Passions de l'âme*—his most comprehensive account of the mind-body interaction—as falling short of the epistemological standards of clarity, distinctness, and obviousness, he had himself set.[10] According to this historiographical *doxa*, Cartesianism was a dualist philosophical system mainly concerned with the clear and distinct operations of the intellect; surely the prominence of the imagination as a major site of embodied cognition in the *Regulae ad directionem ingenii* was a youthful mistake that the more mature Descartes soon corrected in the *Meditationes*, where he highlighted the cognitive limits of the imagination. Thus, in Meditation 2, Descartes remarks that complex geometrical figures could be apprehended thanks to clear and distinct conceptual definitions but *not* through mental images: one could clearly understand that a chiliagon was a geometrical figure with a thousand equal sides; but no one could have a clear mental picture of it.[11] Images, whether as external props (drawings) or mental ones, could only represent the most simple relations and ratios. In line with the dualist, Cartesian acknowledgement of the limitations of the imagination and its dismissal, even revisionist current scholarship alive to Descartes's rhetorical concerns has described Descartes's diagrammatic illustrations as disingenuous rhetorical performances of clarity and distinctness rather than as analytical evidence that these epistemic requirements were fulfilled.[12]

It is possible, however, to do better justice to the importance of the imagination in the Cartesian production of knowledge. Following on the tradition of close mathematical readings initiated by Pierre Costabel, David Rabouin has investigated here and elsewhere Descartes's mathematical practice and shown that mathematical construction necessarily involved manipulating images, on paper then in the mind.[13] In

[10] On imagination in the *Passions de l'âme*, see AT XI, pp. 344–50, p. 361, CSM 1, p.336–38, p.344. On the condemnation of Descartes's account of the imagination, see for example Marjorie Greene, "Cartesian Passions: The Ultimate Incoherence" in *Descartes* (Indianapolis/ Cambridge: Hackett publishing company, 1985), pp. 23–52. See also Lisa Shapiro, "Descartes' Passions of the Soul and the Union of Mind and Body," *Archiv für Geschichte der Philosophie* 85, no 3 (2003), 211-48.

[11] AT VII, p. 72; CSM 2, p. 50.

[12] See Jean-Pierre Cavaillé, *Descartes–La Fable du monde* (Paris: Vrin EHESS, 1991), pp. 127-80. Christoph Luthy, "Where Logical Necessity Becomes Visual Persuasion: Descartes Clear and Distinct Illustrations" in *Transmitting Knowledge–Words, Texts, Instruments,* ed. by Sachiko Kusukawa and Ian Maclean (Oxford: Oxford University Press, 2006), pp. 97–133.

[13] David Rabouin, *Mathesis universalis. L'idée de "mathématique universelle" d'Aristote à Descartes* (Paris: PUF, 2009).

philosophy, Dennis Sepper has provided a clear and distinct account of the crucial role played by the imagination in Descartes's mathematical and methodical thought. Led by the Cartesian claim that mathematical practice provided the outlines of the method, Sepper has spelled out the aim of the *Regulae*, namely, teaching one how to translate every problem in terms of ratios (relations-as-proportions) within the plane of the imagination. Sepper's work thus describes a type of Cartesian 'schematism' in the Kantian sense of the term: the imagination synthetically reduces experiential data into ratios, that is, measurable relations within space-as-extension.[14]

Indeed, against the dualist, doxical reading of Descartes, if we envisage the imagination from the perspective of the Cartesian *ingenium*, the cognitive work done by the imagination is *not* the obscure and confuse opposite to the clear and distinct analytical work done by the intellect, but the very foundation of clarity and distinctness. The technical definition of the *ingenium* in Rule 12 of the *Regulae* identifies it with a combinatorial power of invention; numerous contributions in this volume examine this definition in detail and I will not dwell on it. Suffice to say that, when it comes to the sort of problem solving described in the *Regulae*, this power of invention transfers the qualitative perceptions of relations in the physical world into quantitative relations manipulated by the mind: this 'transfer' is made possible thanks to extension: the very substance of body (or the external world) becomes one of the 'simple natures' and one of the fundamental clear and distinct ideas.[15] The *Regulae* thus describes a series of cognitive transfers from qualitative perceptions of the physical world to mental representations of quantitative relations by means of the shared category of extension. In so doing, the *Regulae* sketches a very specific instance of the cognitive work involved in metaphor and outlines its epistemic productivity in concept formation and problem solving.[16] Indeed, glossing Aristotle's use of ἀγχινοία (translated as *ingenium* by Ermolao Barbaro in 1454), but also Cicero's understanding of *ingenium* in his rhetorical works, the early moderns identified the *ingenium* with the cognitive ability to 'find commonalities' one needed in order to infer properly in syllogistic reasoning,

[14] Dennis Sepper, *Descartes's Imagination: Proportions, Images, and the Activity of Thinking* (Berkeley: University of California press, 1996).

[15] On the early apprehension of such 'clear and distinct ideas' as reductions from qualitative to quantitative apprehensions, see Meditation 1, AT VII, p. 20; CSM 2, pp. 13–4 commented upon by Jean-Luc Marion, *Sur la pensée passive de Descartes* (Paris: Presses Universitaires de France, 2013), pp.177–84.

[16] On the relevance of a cognitive account of metaphor to concept formation in the early modern period, see Timothy Chesters, "La Métaphore et les catégories *ad hoc*," in *Le Retour du signifiant*, ed. Xavier Bonnier and Ariane Bayle (Paris: Classiques Garnier, 2019), 33-44.

but also to devise good metaphors and even good puns and jokes—both Denis Kambouchner and Igor Agostini touch upon the Cartesian reformulation of the *ingenium* as inventive power in this volume.[17] Clear and distinct mathematical metaphors must be understood against the backdrop of those Renaissance accounts of the *ingenium*: such mathematical metaphors are neither a contradiction in terms nor purely rhetorical shortcuts in the *Regulae*, or for that matter, in Descartes's subsequent writings. Indeed the cognitive productivity of the *ingenium* pervades Descartes's later works. Thus, Descartes carried on relying on the explanatory powers of a metaphorical reduction to 'clear and distinct ideas-as-images' throughout his philosophical career: think of the river-as-cosmic-vortex in *Le Monde* (1627-28), or of the blind man's stick as *analogon* to vision in the *Dioptrique* (1637).[18] Furthermore, the sustained inventions of the imagination are crucial to the exercise of sceptical doubt intended to reach indubitable truths in the first of the *Meditationes* (1641): imagine a mad melancholic, a satyr or a siren, a deceiving God or an evil demon.[19] The *Meditationes* thus appeals to the *ingenium* to generate or apprehend mental representations that are instrumental to sustain cognitive attention and intellectual effort–these representations can be fictions generated by the *ingenium* in order to fuel methodical and hyperbolic doubt; yet they also include one of the first few 'clear and distinct ideas', that of God, apprehended by means of 'the blade of one's *ingenium*' or a sharp wit in Meditation 3;[20] Igor Agostini has outlined the scholastic precedents to this metaphysical and epistemic use of the *ingenium*. Twenty years after the mathematical problem solving of the *Regulae*, the *Meditationes* appeal time and again to the *ingenium* in order to establish the metaphysical foundations of Cartesianism. The cognitive primacy of the *ingenium* as creative imagination in Descartes's works was not a youthful mistake.[21]

II. Reassessing the 'Age of Reason' : Cartesian Ingenuity and The Cultural History of the *Âge Classique*

[17] Aristotle, *Posterior Analytics*, 89b10; Cicero, *On the Orator*, I.25 on the importance of a good *ingenium* in oratory, and II.62 on ingenious jokes.
[18] AT XI, pp. 58–60; AT VI, pp. 84-6, CSM 1, pp. 153–4.
[19] AT VII, pp. 18–20, pp. 21-22; CSM 2, p.13, pp.14-15.
[20] 'caligantis ingenii mei acies': AT VII, p. 52; translated as 'the eye of my darkened intellect' in CSM 2, p. 36.
[21] The permanence of the concept of *ingenium*, whether explicitly thematized or not, in Descartes's writings, instantiates the metaphysical importance of the third 'clear and distinct idea', that of the mind-body union which is reasserted in Meditation VI. On this, see Marion, *Sur la pensée passive de Descartes.*

By putting the *ingenium* as embodied cognition and its metaphorical work squarely at the heart of Cartesian philosophy, this volume also calls for a reassessment of the classic historiographical representation of the French seventeenth-century as the 'age of reason' supposedly heralded by Descartes's dualist rationalism. In this traditional, historiographical perspective, seventeenth-century French grammar and poetics turned the Cartesian epistemic criteria of clarity and distinctness into social and aesthetic norms of good communication and taste. Thus, Port-Royal grammar promotes the ability of words to act as transparent signifiers that denote concepts clearly and distinctly, and Port Royal *logique* emphasizes the importance of good, univocal definitions of words, the model for which is provided by mathematics.[22] The poetic formula of this rationalist creed finds its enduring expression in Nicolas Boileau's *Art poétique*: 'What one conceives well can be uttered clearly'.[23] The emergence of French analytical prose in the *Âge classique* would therefore be the semantic expression of Cartesian dualist rationalism: words are the transparent expressions of concepts in the mind; they are radically distinct from the things in the words that they *signify* and no longer *resemble*. Thus, according to Michel Foucault's *Les Mots et les choses* (*The Order of Things*), Cartesian semiotics puts an end to the Renaissance analogical regime of signification and heralds an early modern version of the arbitrariness of the sign, made explicit in the opening of Descartes's cosmological fable, *Le Monde ou traité de la lumière*:

> You well know that words bear no resemblance to the things they signify, and yet they do not cease for that reason to cause us to conceive of these things ... Now if words, which signify nothing except by human convention, suffice to conceive of things to which they bear no resemblance ....

Natural signs, like language, obey the same semiotic logic in Cartesian philosophy:

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[22] 'Grammar is the art of speech. Speech is explaining one's thoughts by means of signs that men have invented for that purpose.' (La grammaire est l'art de parler. Parler est expliquer ses pensées au moyens de signes que les hommes ont inventez à ce dessein). Antoine Arnauld, *Grammaire generale et raisonnée contenant les fondemens de l'art de parler, expliquez d'une manière claire et naturelle* (Paris, 1660), p.5. Antoine Arnauld, Pierre Nicole, *La Logique ou l'art de penser*, ed. Charles Jourdain (Paris: Gallimard, 1992), pp.76–91. Compare with Descartes's critique of equivocality and confusion in the definition of the word 'place' as a source of debate among the learned. Descartes, Regula XIII, AT X, pp. 433–4; CSM 1, pp. 53–54.

[23] Nicolas Boileau, *L'Art poétique*, chant I, v.209: 'Hence, before you write, do learn to think. Our idea might be more or less obscure:/ expression follows it, either less neat, or purer./ What one thinks well can be said clearly,/ And words to say it come easily.' (Avant donc que d'écrire apprenez à penser./ Selon que notre idée est plus ou moins obscure,/ L'expression la suit, ou moins nette, ou plus pure./ Ce que l'on conçoit bien s'énonce clairement,/Et les mots pour le dire arrivent aisément).

> why could not nature also have established a certain sign that would cause us to have the sensation of light, even though that sign in itself bore no similarity to that sensation? Is it not thus that she has established laughter and tears, to cause us to read joy and sorrow on the faces of men?[24]

Natural representation means that a tear (signifier) immediately evokes in us the idea of sorrow (signified) from which we infer the sad mood of our interlocutor (referent). Descartes's emphasis on signs-as-conventions is mostly intended to empty signs, whether linguistic or not, of any analogical content. Yet Descartes's account of signs in the opening of *Le Monde* also offers a perspective on a seventeenth-century cultural landscape shaped by ingenuity rather than rationalism.

In the first chapter of *Le Monde*, Descartes does not describe the shared, 'conventional' understanding of natural and linguistic signs as a semiotic version of dualist rationalism where a physical 'word-as-sound' would arbitrarily and univocally denote a single concept for all and everyone endowed with '*bon sens*' or reason. If anything, the Cartesian semiotic regime assumes ingenuity understood here as the dynamic work of different, individual imaginations involved in the common making of meaning. In the individual *imagination* of each of us, signs evoke similar, yet not quite identical ideas-as-representations. The three examples written in different rhetorical modes that Descartes adduces to make his point against analogical signs demonstrate his awareness of the diversity of *ingenia* as wits. The first one focuses on the sense of hearing. Even when we are not paying attention to the *meaning* of a word said in front of us, our experience of it as pure sound prompts in us the idea of 'sound', which does not resemble in any way the physical phenomenon:

> Do you think that, even when we do not pay attention to the meaning of words and hear only their sound, the idea of that sound, which forms in our thought, is anything like the object that is the cause of it? A man opens his mouth, moves his tongue, forces out his breath: in all these actions, I see nothing that is [not] very different from the idea of the sound that they cause us to imagine.[25]

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[24] AT XI, p. 406, translated in R. Descartes, *Le Monde, ou traité de la lumière*, intr. and trans. M. S. Mahoney (New York: Abaris books, 1979), p.5: 'Vous sçavez bien que les paroles n'ayant aucune ressemblance avec les choses qu'elles signifient ne laissent pas de nous les faire concevoir ... Or si des mots qui ne signifient que par l'institution des hommes, suffisent pour nous faire concevoir des choses avec lesquelles ils n'ont aucune ressemblance; pourquoy la Nature ne pourra-t-elle pas aussi avoir estably certain signe qui nous fasse avoir le sentiment de la Lumiere, bien que ce signe n'ait rien en soy qui soit semblable à ce sentiment? Et n'est-ce pas ainsi qu'elle a estably les ris & les larmes, pour nous faire lire la joye & la tristesse sur le visage des hommes?'.

[25] AT XI, pp. 406–07: 'Pensez-vous, lors mesme que nous ne prenons pas garde à la signification des paroles, & que nous oyons seulement leur son, que l'idée de ce son qui se forme en nostre pensée, soit quelque chose de semblable à l'objet qui en est la cause? Un homme ouvre sa bouche, remuë la langue,

The double negative in the original French text ('Je ne vois rien qui ne soit fort different') allows for two interpretations of this passage. In the first one, the second negation is purely redundant ('rien qui ne soit' would therefore be equivalent to 'rien qui soit'): word-as-pure-sound prompts the dynamic mental representation of a speaking man. This representation is in no way a good analogy of its referent, since Descartes then draws on the philosophical *doxa* to assert the true nature of sound: sound consists of moving parts of air. If the idea of sound resembled the object that caused it, we should only imagine the motion of parts of air when forming the idea of sound in our mind, and this is not what we do. Alternatively, if we read the second negation as a meaningful rather than pleonastic or redundant one, the vivid description of the speaking man that one *sees* is sharply contrasted with an unspecified idea-as-image of sound that one *imagines*. In both interpretations, however, Descartes makes it clear that the sign prompts cognitive work *in the imagination*, not reason ('cause us to imagine'). Descartes appeals to that very cognitive work in the deictic little scene written in the present that stages the speaking man—'in all these I see'. In both interpretations too, conceptual clarity and distinctness amount to the vividness of well-defined mental images. Such clarity and distinctness does not presume that signs are univocal: the shared concept-as-image that signs prompt remains either susceptible to limited variants–'not very different' from a speaking man as 'we imagine it'–or altogether unspecified. The successive shifts from 'we', 'I' and 'us' point to a shared cognitive experience. Imagination, rather than *bon sens*, is 'la chose du monde la mieux partagée' here: the 'clear and distinct idea' functions as a place-holder for a variety of similar, yet not quite identical, cognitive experiences of concept formation in the imagination.

Such imaginary vivid scenes, or hypotyposes, make up the remaining two examples which focus on ideas born from the sense of touch. The first one briefly evokes a domestic scene, and ends in a rhetorical question:

> One passes a feather lightly over the lips of a child who is falling asleep, and he perceives that someone is tickling him. Do you think the idea of tickling that he conceives resembles anything in this feather?[26]

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pousse son haleine, je ne vois rien en toutes ces actions qui ne soit fort different de l'idée du son qu'elles nous fait imaginer.'

[26] AT XI, p.407: 'On passe doucement une plume sur les lèvres d'un enfant qui s'endort, et il sent qu'on le chatoüille, pensez-vous que l'idée du chatoüillement qu'il conçoit, ressemble à quelque chose de ce qui est en cette plume?'.

The second one is the epic depiction of a soldier returning from a riotous skirmish:

> A soldier returns from battle; during the heat of combat he could have been wounded without being aware of it. But now that he begins to cool off, he feels pain and believes that he has been wounded. A surgeon is called, the soldier's armor is removed, and he is examined. In the end, one finds that what he felt was nothing but a buckler or a strap, which was caught under his armor, and was pressing on him and making him uncomfortable.[27]

Enargia, the rhetorical trope intended to generate a vivid sense of presence, shapes this text. The present tenses and markers ('maintenant'), the climactic depiction of the panicked investigation of an absent wound through a series of increasingly short verbal clauses ('On appelle un chirurgien...on le visite'), contrasting with the long sentence describing the discovery ('et on trouve enfin que...') turn the example into a little drama to be performed in the reader's imagination.

Whether the sketch of a speaking man's mouth, that of a dozing infant whose lips are stroked with a feather, or the tense quest for an imaginary wound, Cartesian examples all offer different and striking instances of Descartes's argument, namely the dissimilarity between thoughts-as-sensory-perceptions and the referents that caused them. By accumulating vivid examples in different rhetorical and poetic styles–the schematic sketch opening an intricate philosophical argument, the quiet lyricism of a domestic observation 'in the humble style' closed by a rhetorical question, or the pseudo-epic staccato of an after-battle scene–Descartes takes into account the *différence des esprits* and shapes his argument into three distinct 'scenes' intended to strike the varying *ingenia*-as-imaginations of different types of readers.[28] Uprooting the wrong concept of sign-as-*analogon* in order to replace it with the right one of sign-as-arbitrary-representation starts, once again, with fathoming the images best suited to a variety of *ingenia*-as-wits. The Cartesian theory of signs shows that ingenuity was central to Descartes's philosophical project and underpinned his stylistic and rhetorical choices. Envisaged from that perspective, the Cartesian legacy to the *Grand siècle*

[27] AT XI, pp. 407–08, translation pp.5–6: 'Un gendarme revient d'une mélée; pendant la chaleur du combat il aurait pû estre blessé sans s'en appercevoir; mais maintenant qu'il commence à se refroidir, il sent de la douleur, il croit estre blessé, on appelle un Chirurgien, on oste ses armes, on le visite, & on trouve enfin que ce qu'il sentoit n'estoit autre chose qu'une boucle ou une courroye qui s'estant engagée sous ses armes le pressoit & l'incommodoit'.

[28] On different types of *ingenia*, see AT VI, p. 15; CSM 1, p. 18.

contributes to its reassessment not so much as the age of reason, but as the age of ingenuity.

III. Reassessing the 'Scientific Revolution' : Cartesian Ingenuity in the History of Science.

Such reassessment of the Cartesian legacy is currently taking place in the history of science. Alongside the dualist dismissal of analogy in semiotics, the historiographical *doxa* regarding the Cartesian contribution to the Scientific Revolution had outlined the mathematical rationalism of Descartes's mechanical philosophy. Against the qualitative explanatory framework central to scholastic natural philosophy, Cartesian science explained nature by reducing it and analysing it into quantifiable interactions between bodies as extended matter, and local motion. As Dan Garber puts it, the natural bodies that Cartesian science handles are 'geometry made real', and the paradigm of scientific demonstrations in physics, especially as far as it explanatory power was concerned, was no longer a 'scientific syllogism' whose premises were general and necessary, but borrowed from mechanics the mathematical modelling of natural bodies and their interaction in motion.[29] In the last decade, however, Cartesian physics were historicized and re-located in what has been labelled 'baroque science', and what I would call European cultures of ingenuity.[30] These cultures of ingenuity were characterised by social performances, but also artistic and mechanical displays of wit, intended to generate surprise and wonder in their audience. Machines remain *engins*, that is, wit made mechanical, in Descartes's mechanistic natural philosophy.[31]

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[29] Daniel Garber, *Descartes's Metaphysical Physics* (Chicago: University of Chicago Press, 1992). In the scholastic, Aristotelian encyclopaedia, mechanics consist of the explanation of machines and their motions, that is, man-made contraptions whose motions are contrived. By contrast, physics consists of the explanation of natural changes–growth and decay, alongside local motion–and assumes a qualitative ontology in which four different types of causes–the material, efficient, formal, and final ones–determine the behaviour of a natural body. Within an Aristotelian framework, appealing to the mathematical modelling of mechanics in order to explain the qualitative changes affecting natural bodies in physics constitute a methodological error known as *metabasis*, that is, the use of concepts belonging to a specific discipine or mode of thought to explain an altogether different discipline or mode of thought. On *metabasis* and its Cartesian violation, see Amos Funkenstein, "Construction and Metabasis, Mathematization and Mechanization," in *Theology and the Scientific Imagination* (Princeton: Princeton University Press), pp. 299–326.

[30] Gal, Ofer and Raz Chen-Morris, *Baroque Science* (Chicago: University of Chicago Press, 2012).

[31] On the etymology of *engin*, which used to denote one's wit before referring to the mechanical products of it, see the chapter "French" in Alexander Marr, Raphaële Garrod, José Ramòn Marcaìda and Richard J. Oosterhoff, *Logodaedalus: Word Histories of Ingenuity in Early Modern Europe* (Pittsburgh: Pittsburgh University Press, 2018), pp. xxx.

In the opening chapter of *Le Monde* mentioned above, it is striking that Descartes casts nature, that is, matter in motion, as a law-giving allegory, whose edicts establish the semiotic regime of natural signs in the same conventional and arbitrary manner as human language ('why could not nature also have established a certain sign ..'). Nature in this passage thus fabricates artifice, art (*ars*) in the period sense, that is, a set of shared rules mastered through practice (*exercitatio*) by the recipients of natural signs. That nature should be understood by means of man-made, ingenious artifices remained a constant in Descartes's natural-philosophical investigations: references to such ingenious artifices feature as early as the *Cogitationes privatae*, where visual tricks displayed in a carefully designed garden or a room prompt optical explanations:

> In a garden we can produce shadows to represent certain shapes, such as trees, or we can trim a hedge so that from a certain perspective it represents a given shape. Again, in a room, we can arrange for the rays of the sun to pass through various openings so as to represent different numbers or figures, or we can make it seem as if there are tongues of flame, or chariots of fire, or other shapes in the air. This is all done by mirrors which focus the sun's rays at various points.[32]

The *Dioptrique* and the *Meteores* testify to the same concern with ingenious inventions and their explanations. Right from the start, The *Dioptrique* focuses on mechanical invention intended to 'increase the power [of our sight]', namely glasses, spyglasses, and telescopes: the design of a new, precision lens-grinding machine is the apex of the book.[33] In a similar fashion, the opening statement of the *Météores* highlights the explanation of the rainbow as its masterpiece; it is the topic of the final discourse:[34]

> The rainbow is such a remarkable wonder of nature, good wits have always investigated its cause with such curiosity, yet have known so little about it ... Having considered that this rainbow can appear not only in the heavens, but also in the air close to us, each and every time that there happens to be in it several water drops lit by the sun, as experience has us see near some fountains ...[35]

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[32] AT XI, pp. 215-16; CSM 1, p. 3.

[33] AT VI, pp. 211–28. On Descartes's lens grinding machine as an *engin* within the tradition of 'theatres of machines', see Graham D. Burnett, *Descartes and the Hyperbolic Quest: Lens Making Machines and Their Significance in the Seventeenth Century* (Philadelphia: American Philosophical Society, 2005), pp. 20–27.

[34] AT VI, p.232.

[35] AT VI, p. 325: 'L'Arc-en-ciel est une merveille de la nature si remarquable, & sa cause a esté de tout tems si curieusement recherchée par les bons esprits, & si peu connue.... ayant consideré que cet arc ne peut pas seulement paroistre dans le ciel, mais aussy en l'air proche de nous, toutes fois & quantes qu'il s'y trouve plusieurs gouttes d'eau esclairées par le soleil, ainsi que l'expérience fait voir en quelques fontaines ...'. Translation mine.

Explaining natural wonders is an ingenious pursuit for the natural philosopher, and leads Descartes back to gardens and their fountains. Twenty-years after the *Cogitationes*, the same types of ingenious displays and inventions remain the springboards of Descartes's scientific imagination in the *Essais*. In his *Traité de l'Homme*, the engineer activating waterworks in a carefully designed garden is the very metaphor he uses to describe the mind-body interaction mediated by the animal spirits:

> Similarly you may have observed in the grottos and fountains of the royal gardens that the mere force with which the water is driven as it emerges from its sources is sufficient to move various machines …. Indeed one may compare the nerves of the machine I am describing with the works of these fountains, its muscles and tendons with the various devices and springs which serve to set them in motion, its animal spirits with the water which drives them, the heart with the source of the water, and the cavities of the brain with the storage tanks … And finally, when a rational soul is present in this machine, it will have its principal seats in the brain, and reside there like the fountain-keeper who must be stationed at the tanks to which the fountain's pipes return if he wants to produce, or prevent, or change their movements in some way…[36]

Envisaged from the perspective of ingenuity, this simile is not a mere rhetorical ornament hiding the analytical shortcomings of Descartes's dualism in an anatomical and physiological treatise failing to account for mind and body. Rather, this simile deploys Descartes's wit at work on one of his ingenious scientific pursuit—a treatise dedicated to man as whole— and conjures up the explanatory powers of thinking with images.

[36] AT XI, pp. 130-32, CSM 1, pp. 100-1.