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From Experiment to Simulation: The Cartesian Error of Experience from Galileo to Turing

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Abstract

This paper reexamines the Turing Test by placing it within the broader history of experimentation. Challenging views that link Turing to a continuous scientific tradition from Galileo, it argues that the Imitation Game marks a key epistemological break. Whereas Galileo used experiment to connect observation with mathematical order, and Descartes internalized experience as formal representation, Turing transformed experiment into simulation—producing meaning through formal operations alone. This shift reveals AI not as a recent innovation, but as the outcome of a rationalist tradition that displaces experience with computation. The paper critiques this legacy and calls for restoring experience as a central category of intelligibility.

Keywords: Turing Test; rationalism; experiment; simulation; epistemology of artificial intelligence [†]

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1. Introduction

The Turing Test, introduced in 1950 in Alan Turing's essay "Computing Machinery and Intelligence," is commonly treated as a landmark in the philosophy of artificial intelligence. Yet, it is often analyzed as a self-contained problem in logic or behaviorism, detached from the longer philosophical and scientific traditions that inform it. This paper contends that such an ahistorical reading obscures the conceptual genealogy of Turing's proposal. The Imitation Game does not arise in isolation but emerges from a broader transformation in the epistemological function of experiment that spans from the seventeenth to the twentieth century.

The central claim advanced here is that Turing's thought experiment represents not the continuation of Galileo Galilei's experimental method, as some recent scholarship suggests (e.g., Gonçalves 2023), but rather the culmination of a Cartesian rationalism that gradually displaced lived experience by formal intelligibility. In Galileo, experiment remained a means of revealing the rational order of nature through mathematized observation. In Descartes, experience was internalized and subordinated to clear and distinct ideas; knowledge became a function of representation rather than encounter. In Turing, the notion of experiment is reconfigured once again: the logical machine becomes a device for simulating the conditions of intelligence itself. The progression from revelation to representation to simulation marks the historical trajectory of the reduction of experience to formal structure.

The argument unfolds in six sections. The first reconstructs Galileo's conception of mathematical experiment as an epistemic form grounded in sensory observation and idealization. The second examines Descartes's transformation of experience into representation, emphasizing Gian-Carlo Rota's critique of the Cartesian reduction of phenomenality. The third analyzes Turing's logical experiment and its redefinition of intelligence as a computable phenomenon. The fourth contrasts methodological parallelisms with epistemological ruptures between early modern rationalism and computational thought, arguing that the apparent continuity between Galileo and Turing is superficial. The fifth considers the philosophical consequences of this genealogy for understanding artificial intelligence today. Moving from historical reconstruction to systematic reflection on AI and epistemology, the sixth and final section reflects on the fate of experience in the context of contemporary AI and introduces the notion of "artificial intelligibility."

The analysis that follows adopts a genealogical rather than a linear historical approach. Its purpose is not to trace direct causal influence from Galileo to Turing, but to reconstruct a series of conceptual transformations in the relation between experience, reason, and intelligibility. The figures of Galileo, Descartes, and Turing are treated as paradigmatic articulations of distinct epistemic regimes—revelation, representation, and simulation—rather than as members of a continuous tradition. The argument therefore concerns the evolution of epistemic form, not the chronology of influence.

To situate the Turing Test historically is thus not to trace a chain of influence but to recover the questions that made its formulation intelligible. Without this reconstruction of problems, history becomes a mere sequence of discoveries rather than the unfolding of epistemic tensions. Moreover, any claim of continuity between early modern and computational epistemologies risks anachronism: it projects contemporary notions of information and simulation onto frameworks still structured by theology and teleology.

2. Galileo and the Mathematical Experiment

The modern conception of experiment begins with Galileo Galilei's fusion of empirical observation and mathematical reasoning. In Galileo's writings—particularly *Il Saggiatore* (1623) and *Discorsi e dimostrazioni matematiche intorno a due nuove scienze* (1638)—the experiment occupies a paradoxical position: it is both a sensory engagement with the world and a formal abstraction from it. The falling bodies experiment, for instance, is grounded in observation yet articulated through an idealized mathematical model that no physical trial could perfectly instantiate. Galileo's experiment thus functions not merely as a technical procedure but as an epistemic device mediating between the contingencies of experience and the universality of mathematical law (Palmieri 2009; Palmerino 2011).

This dual structure—empirical grounding and ideal abstraction—defines the Galilean revolution in epistemology. In rejecting Aristotelian empiricism, Galileo maintained that sense experience (*esperienza sensata*) was indispensable but insufficient. Experience required purification through geometry to yield intelligible knowledge. The experiment's role, therefore, was not to reproduce nature but to reveal its mathematical structure. This process exemplifies what Koyré (1943) called the "mathematization of nature": the substitution of qualitative perception with quantitative relations. Yet, for Galileo, this substitution did not sever the bond between knowledge and experience. His experiments presupposed a world accessible to human perception and structured by rational order. Mathematical abstraction served as a means of approaching reality, not as its replacement.

In this respect, Galileo's experimental method remained anchored in what could be called an *epistemology of revelation*. Through measurement and controlled observation, the scientist disclosed an intelligible order already latent in nature. The mathematical idealization was a window onto reality, not an autonomous construct. Even his celebrated *thought experiments*—such as the example of two stones connected by a string—were intended to make visible truths about the physical world that empirical experience only imperfectly conveyed. They presupposed the existence of a natural reality susceptible to mathematical interpretation.

Galileo's commitment to a rational cosmos also presupposed a theological dimension: the laws of nature reflected divine order rather than human construction. Turing's materialism, by contrast, evacuates this metaphysical background. The difference is not merely methodological but ontological—the passage from a world created by reason to a world created through reason itself.

This conception of experiment stands in contrast to later developments in early modern philosophy, where experience gradually loses its revelatory function. In Galileo, mathematics and experience form a dialectical unity: mathematics abstracts from the world in order to understand it more precisely. In Descartes, by contrast, mathematics becomes the ground of certainty itself, and experience is reinterpreted as a mode of mental representation. The Galilean scientist stands before nature as observer and interpreter; the Cartesian thinker constructs nature from within thought. The following section examines this transition, showing how Descartes's rationalism converts the external mediation of experiment into an internal operation of the mind—a transformation that marks the beginning of the epistemological trajectory culminating in Turing's logical formalism.

3. Descartes and the Error of Experience

The transformation of experiment that begins with Galileo reaches a decisive turning point in the philosophy of René Descartes. Whereas Galileo's mathematical method preserved an external relation to the natural world, Descartes redefined knowledge as an internal operation of thought. In his 1637 *Discours de la méthode* (Descartes 1985a) and the 1641 *Meditationes de prima philosophia* (Descartes 1985b), Descartes replaced empirical encounter with the certainty of clear and distinct ideas. The result was a reconfiguration of *experience* itself: no longer the foundation of knowledge, experience became the content of mental representation.

This epistemological shift rests on Descartes's dualistic ontology of *res cogitans* and *res extensa*. The knowing subject no longer participates in the world through embodied perception but apprehends it through ideas that stand in for external reality. Sense experience, fallible and variable, is subordinated to the intellect's power of formal reasoning. In this framework, experiment loses its Galilean function as mediation between observation and law. It becomes, instead, a demonstration of principles derived a priori from reason. The physical world is knowable not through its phenomenal givenness but through its mathematical structure, which can be grasped by the intellect alone (Descartes 1985b).

Descartes's physiology and optics illustrate this transformation. His *Dioptrique* describes vision as the transmission of mechanical signals to the brain, where the mind interprets them. The epistemic act occurs not in perception but in judgment; the world is translated into a system of signs deciphered by thought. This model of cognition inaugurates what Rota (1993, 133–145) calls the Cartesian error of experience. According to Rota, Descartes's philosophy replaces direct contact with the world by a symbolic mediation that equates understanding with representation. Experience becomes an operation on formal objects rather than a lived encounter with phenomena.

This "error" is not merely psychological or moral but ontological. By transforming experience into representation, Descartes detaches knowledge from the conditions of embodiment. The mind becomes a machine for manipulating symbols, and the world a field of extension governed by mathematical law. The Cartesian turn thereby initiates a mode of thought that conceives intelligibility as formal coherence rather than experiential adequacy. What was in Galileo a revelation of order within nature becomes, in Descartes, the construction of order within thought.

This Cartesian rationalism provides the metaphysical and epistemological background for later developments in logic and computation. The identification of cognition with rule-governed manipulation of signs finds its mathematical expression in the formal systems of Leibniz, Boole, and eventually Turing. The conceptual lineage is thus not one of method but of ontology: the reduction of knowledge to symbolic operation. Already in the early eighteenth century, Giambattista Vico had perceived this danger. In the 1744 edition of *Scienza Nuova*, Vico denounced what he called the "barbarism of reflection": the Cartesian belief that certainty arises from abstraction rather than from lived making (Vico 1984). Against the reduction of experience to formal representation, Vico proposed the principle *verum ipsum factum*—the true is what is made. Knowledge, for Vico, is inseparable from embodied practice and historical life. The epistemic inversion between Galileo and Descartes can be expressed in ontological terms. For Galileo, being grounds thinking: existence precedes intelligibility. For Descartes—and, later, for Turing—thinking grounds being (*cogito ergo sum*). This reversal marks the passage from experiment as revelation to simulation as creation.

4. Turing and the Logical Experiment

Alan Turing's conception of intelligence constitutes the final stage in the historical transformation of experiment traced thus far. In "Computing Machinery and Intelligence" (1950), Turing replaces the empirical test of nature with a logical experiment designed to investigate the conditions of intelligibility itself. The so-called Imitation Game is not an experiment in the Galilean sense—an observation of natural phenomena—but a formal construction in which behavior is simulated within an abstract, rule-governed domain. Its purpose is not to measure but to define what counts as "thinking."

The epistemological structure of this experiment follows from the mathematical foundations Turing had established in his earlier work, *On Computable Numbers* (1936). There, he introduced the concept of a "universal machine" capable of executing any effectively calculable procedure. The 1936 paper translated the intuitive notion of mechanical reasoning into a formal model of computation. In doing so, it extended the Cartesian project of identifying thought with rational operation. Just as Descartes grounded certainty in the clarity of ideas manipulated by the mind, Turing grounded intelligibility in the computability of procedures executed by a machine. In both cases, knowledge is defined not by contact with experience but by adherence to formal rules.

The Imitation Game radicalizes this logic. Rather than observing a phenomenon, it establishes a situation in which the distinction between human and machine intelligence is determined by symbolic performance alone. The experiment occurs entirely within language: an exchange of text-based messages whose meaning depends on syntax, not embodiment or perception. What Turing calls "thinking" thus becomes a property of a function—an equivalence class of symbol manipulating behaviors—rather than a manifestation of consciousness. The experiment's success lies not in reproducing cognition but in generating the illusion of its presence.

From an epistemological perspective, the Imitation Game exemplifies what may be termed a logical experiment: an operation that produces its own object of study through formalization. In contrast to Galileo's revelatory experiment, which discloses an external order, Turing's logical experiment constructs an artificial order governed entirely by rules. It is not an attempt to understand how minds think but to demonstrate that the distinction between human and machine can be rendered operational. This marks the culmination of the Cartesian "error of experience." Where Descartes translated experience into representation, Turing replaces representation with simulation.

In this sense, Turing's experiment signifies both a continuation and a rupture. It continues the rationalist ambition to capture intelligibility through formal means but ruptures the empirical grounding that had still persisted in early modern science.

The Imitation Game transforms philosophy's oldest question—"what is thinking?"—into a problem of computation and indistinguishability. Intelligence, once conceived as the unity of rational and experiential life, becomes an effect of algorithmic process. The Cartesian subject is finally externalized: the mind as machine no longer needs to think; it only needs to act as if it did.

5. Continuities and Ruptures in Modern Rationality

Recent scholarship has occasionally suggested a methodological continuity between Galileo's mathematical experiments and Turing's logical experiment (e.g., Gonçalves 2023). Both, it is argued, deploy idealized models and thought experiments to articulate new forms of intelligibility. While this analogy is superficially attractive, it obscures a fundamental epistemological rupture. Galileo's experiments presuppose an external world governed by mathematical order and accessible through controlled observation. Turing's experiment, by contrast, constructs a formal domain in which the criteria of intelligibility are defined by internal consistency rather than empirical adequacy. The difference is not one of degree but of kind: between the revelation of law and the simulation of behavior.

The apparent continuity rests on a category mistake—confusing *methodological form* with *epistemological function*. Both Galileo and Turing employ thought experiments, but to opposite ends. For Galileo, abstraction clarifies empirical phenomena; for Turing, it replaces them. Galileo's *esperienza sensata* remains an act of disclosure: mathematics serves to make sense of the physical world. Turing's imitation game, conversely, suspends reference to the physical world altogether, creating an artificial setting in which performance substitutes for understanding. The epistemic function of the experiment is thus inverted.

Turing's explicit invocation of Galileo in the "theological objection" section of *Computing Machinery and Intelligence* should therefore be read rhetorically rather than epistemologically. His appeal to Galileo aligns him with the scientist who defied dogma, not with the thinker who disclosed nature's mathematical order. The analogy legitimizes intellectual rebellion but conceals a profound methodological rupture: Turing's experiment no longer seeks truth in the world but coherence within a formal system.

Descartes's philosophy explains this inversion. The Cartesian turn from experience to representation transformed the relation between thought and reality. In this framework, the validity of knowledge depends not on the immediacy of perception but on the coherence of ideas. Turing inherits this rationalist legacy through the mathematical formalism of twentieth-century logic. The Imitation Game is Cartesian in structure even as it is Galilean in rhetoric. It mimics the language of experiment while internalizing its operation within a closed system of symbols. This combination of formalism and operationalism—the belief that intelligence can be instantiated by rule-governed manipulation—marks the culmination of the Cartesian "error of experience."

Recognizing this rupture clarifies the historical and philosophical significance of Turing's work. It is not the modernization of the Galilean experiment but its transformation into a new epistemic paradigm: *experiment as simulation*. This shift defines the logic of contemporary artificial intelligence. What Galileo achieved through observation and mathematical idealization, Turing accomplishes through symbolic construction. The world of experience is replaced by a world of computation.

This genealogical reinterpretation contributes to current debates on the epistemology of AI by reframing the question of continuity. The issue is not whether Turing's thought experiment resembles Galileo's, but how it redefines the very meaning of experiment in a culture of formal rationality. The novelty of this analysis lies in exposing the hidden Cartesian substrate of AI's conceptual foundations. By tracing the Turing Test back to Descartes rather than Galileo, the argument demonstrates that artificial intelligence is not a technological rupture but the logical fulfillment of a philosophical trajectory that began with the internalization of experience.

6. The Fate of Experience in the Age of Artificial Intelligibility

The historical trajectory traced through Galileo, Descartes, and Turing reveals a profound transformation in the epistemic status of experience. From revelation to representation to simulation, experience moves from being the ground of intelligibility to being progressively displaced by formal structure. In Galileo, mathematics illuminates the order of nature through sensory observation. In Descartes, knowledge becomes a property of mental representation, and the world is recast as the object of thought. In Turing, the process reaches completion: the experiment ceases to refer to experience at all, becoming instead a procedure that produces intelligibility through computation.

This transformation defines the condition of what may be called artificial intelligibility—the mode of understanding that characterizes contemporary AI. In the logic of machine learning and large-scale computational systems, knowledge no longer emerges from the interaction between subject and world but from the manipulation of data within autonomous formal architectures (Floridi 2019; Crawford 2022). The epistemic object of AI is not the world as experienced but the world as encoded. This is the culmination of the Cartesian "error of experience" identified by Rota (1993): the belief that understanding can be derived from formal coherence alone. The computational paradigm replaces the immediacy of encounter with the efficiency of simulation, a process intensified by the epistemic opacity of computational systems (Humphreys 2004; Leonelli 2016).

Contemporary developments in artificial intelligence illustrate the continuing significance of this shift from experience to formal structure. Large language models and so-called foundation models operate by extracting statistical regularities from vast corpora of encoded data, thereby exemplifying the mode of artificial intelligibility grounded not in perceptual encounter but in patterned abstraction (e.g. Bender and Koller 2020; Bommasani et al. 2021). Even the long-standing debate between symbolic and subsymbolic approaches to AI—often framed as a contest between logic and learning—remains within the Cartesian framework of cognition as rule-governed manipulation, whether executed over symbols or over statistical parameters (Ilkou and Koutraki 2020). These contemporary developments thus exemplify, rather than transcend, the epistemic trajectory traced from Descartes to Turing, in which intelligence becomes increasingly defined by the internal operations of formal systems rather than by embodied experience.

Recognizing this genealogy has direct philosophical consequences. Contemporary debates on AI often oscillate between enthusiasm for technological achievement and anxiety about the loss of human uniqueness, a tension exemplified in works such as Bostrom (2014). Yet both responses remain captive to the Cartesian framework that opposes mind to matter and reduces cognition to rule-following—a framework that continues to inform much of contemporary AI even in its most sophisticated computational manifestations. Historicizing the Turing Test reveals that this framework is not inevitable but historically contingent. The formalization of intelligence was not a discovery but a construction—a redefinition of knowledge that privileges operation over perception. To the extent that AI continues to embody this conception, it perpetuates rather than transcends the epistemology of modern rationalism.

Understanding the fate of experience in this context therefore requires more than technical critique; it demands philosophical self-awareness. The problem is not that machines cannot think, but that human thinking has come to be modeled on the machine. The imitation game is no longer confined to the test Turing proposed; it has become the paradigm of cognition itself. Restoring the dimension of experience to the discourse on intelligence means questioning the very notion of intelligibility that underwrites contemporary AI (Marcus and Davis 2019; Mitchell 2019). Artificial intelligibility therefore names not a property of machines but the epistemic framework within which their operations are taken to constitute understanding, often independently of experiential grounding. This is not an antiquarian gesture but a critical task: to recall that knowledge, before it became formal, was always experiential.

Although metaphors of mind have changed historically, computational metaphors do more than describe cognition—they shape it. With Turing, experience is no longer the foundation of intelligibility; instead, formal structure and symbolic manipulation become the criteria of what is considered meaningful or knowable. Thus, even as metaphors shift, the computational paradigm redefines the very terms in which experience and intelligence are conceptualized (Hayles 2005; Chun 2016). This shift does not deny the value of formal models in analyzing or representing experience. Rather, it marks a profound reconfiguration of the epistemic status of experience itself. In moving from Galileo, where mathematics illuminates experience, to Turing, where simulation replaces experience, we see a displacement: experience becomes secondary to the operation of formal systems. While fields such as embodied cognition and affective computing seek to re-center experience (Thompson 2007; Clark 2016; Gallagher 2017), the dominant logic of AI remains grounded in encoded rather than lived data.

The Turing Test, though pragmatic in intent, thus redefines what it means to experiment and what it means to know. By focusing on behavioral outputs within a formal system, it embodies a Cartesian approach: privileging operational coherence over experiential reality. Even if Turing aimed to avoid metaphysics, the philosophical consequence of his proposal has been the transformation of experimentation from a means of uncovering experiential truths to a simulation that takes place entirely within a symbolic domain.

AI has undoubtedly expanded our conception of intelligence, allowing us to imagine non-human and non-biological forms of cognition. Yet this expansion often occurs within a framework that continues to privilege formal, rule-governed operations—a legacy of the Cartesian and Turingian paradigm. While it is important to recognize the plurality of intelligences, the concern remains that as long as intelligence is defined through computational or operational criteria, the richness of experience—once the foundation of intelligibility—will be marginalized. The goal is not to deny non-human intelligence, but to recall that intelligibility was once rooted in experience, not only in formalism.

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References

Bender, E. M., & Koller, A. (2020). Climbing towards NLU: On meaning, form, and understanding in the age of data. *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*, 5185–5198.

Bommasani, R., Hudson, D., Adeli, E., Altman, R., et al. (2021). On the opportunities and risks of foundation models. arXiv:2108.07258.

Bostrom, N. (2014). Superintelligence: Paths, dangers, strategies. Oxford University Press, Oxford.

Chun, W. H. K. (2016). Updating to remain the same: Habitual new media. MIT Press, Cambridge, MA.

Clark, A. (2016). Surfing uncertainty: Prediction, action, and the embodied mind. Oxford University Press, Oxford.

Crawford, K. (2022). The atlas of AI: Power, politics, and the planetary costs of artificial intelligence. Yale University Press, New Haven, CT.

Descartes, R. (1985a). Discourse on the method. In J. Cottingham, R. Stoothoff, & D. Murdoch (eds.), *The philosophical writings of Descartes*, vol. 1, 111–151. Cambridge University Press, Cambridge.

Descartes, R. (1985b). Meditations on first philosophy. In J. Cottingham, R. Stoothoff, & D. Murdoch (eds.), *The philosophical writings of Descartes*, vol. 2, 1–62. Cambridge University Press, Cambridge.

Floridi, L. (2019). The logic of information: A theory of philosophy as conceptual design. Oxford University Press, Oxford.

Galilei, G. (1623). Il saggiatore. Giacomo Mascardi, Rome.

Galilei, G. (1638). Discorsi e dimostrazioni matematiche intorno a due nuove scienze. Elsevier, Leiden.

Gallagher, S. (2017). Enactivist interventions: Rethinking the mind. Oxford University Press, Oxford.

Gonçalves, B. A. (2023). Galilean resonances: The role of experiment in Turing's construction of machine intelligence. *Annals of Science* 81(3), 359–389. https://doi.org/10.1080/00033790.2023.2234912

Hayles, N. K. (2005). My mother was a computer: Digital subjects and literary texts. University of Chicago Press, Chicago.

Humphreys, P. (2004). Extending ourselves: Computational science, empiricism, and scientific method. Oxford University Press, Oxford.

Ilkou, E. & Koutraki, M. (2020). Symbolic Vs Sub-symbolic AI Methods: Friends or Enemies?. In S. Conrad & I. Tiddi (eds.), Proceedings of the CIKM 2020 Workshops co-located with 29th ACM International Conference on Information and Knowledge Management (CIKM 2020), Galway, Ireland, October 19-23, 2020. https://ceur-ws.org/Vol-2699/paper06.pdf

Koyré, A. (1943). Galileo and Plato. *Journal of the History of Ideas* 4(4), 400–428. https://doi.org/10.2307/2707166

Leonelli, S. (2016). Data-centric biology: A philosophical study. University of Chicago Press, Chicago.

Marcus, G., & Davis, E. (2019). Rebooting AI: Building artificial intelligence we can trust. Pantheon, New York.

Mitchell, M. (2019). Artificial intelligence: A guide for thinking humans. Farrar, Straus and Giroux, New York.

Palmieri, P. (2009). A phenomenology of Galileo's experiments with pendulums. *The British Journal for the History of Science* 42(4), 479–513. https://doi.org/10.1017/S0007087409990033

Palmerino, C. R. (2011). Galileo's use of medieval thought experiments. In K. Ierodiakonou & S. Roux (eds.), *Thought experiments in methodological and historical contexts*, 101–125. Brill, Leiden.

Rota, G.-C. (1993). Pensieri discreti. Garzanti, Milan.

Thompson, E. (2007). Mind in life: Biology, phenomenology, and the sciences of mind. The Belknap Press of Harvard University Press, Cambridge, MA.

Turing, A. M. (1936). On computable numbers, with an application to the Entscheidungsproblem. *Proceedings of the London Mathematical Society* s2–42(1), 230–265. https://doi.org/10.1112/plms/s2-42.1.230

Turing, A. M. (1950). Computing machinery and intelligence. *Mind* 59(236), 433–460. https://doi.org/10.1093/mind/LIX.236.433

Vico, G. (1984). *The New Science* (T. G. Bergin & M. H. Fisch, Trans.). Cornell University Press, Ithaca.