

THE READABILITY OF REALITY

From Knowability to Sign: A Metaphysical Inquiry into Meaning, Āyāt, and Their Grounds

A philosophical monograph on the conditions under which reality becomes available to knowledge and significance.

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Publication Note

This edition revises and substantially expands the working manuscript supplied for editorial treatment. The argument has been reorganized for continuity, terminology has been standardized, and the prose has been edited for clarity and scholarly tone. The monograph remains a philosophical inquiry rather than a scientific or theological proof-text. Its central proposal is abductive: the phenomenon called readability may be interpreted more coherently when objective structure, epistemic access, corrigibility, consciousness, and signification are considered together.

The Qur'ānic material is approached through semantic and conceptual analysis. No claim is made that the Qur'ān functions as a laboratory manual or that isolated verses predict modern scientific results. The purpose of the final sections is to examine whether the Qur'ānic language of āyāt offers a distinctive metaphysical vocabulary for understanding a world that can be known and can also signify.

Abstract

Why can reality be known? The problem appears under many headings: the intelligibility of nature, the success of science, the applicability of mathematics, realism, representation, information, consciousness, and meaning. This monograph argues that these discussions intersect around a broader phenomenon that deserves explicit analysis. Reality is not merely orderly; it is repeatedly available for disciplined discovery. Human beings and other epistemic systems can encounter patterns, construct representations, expose them to correction, predict novel results, and accumulate knowledge across persons and generations. The study calls this phenomenon readability.

Readability is defined as the objective availability of reality to constrained, corrigible, and progressively integrative inquiry. The concept is distinguished from order, intelligibility, information, meaning, and signification. Naturalism, physicalism, structural realism, informational and mathematical ontologies, and classical theism are compared without assuming that scientific success deductively proves any one of them. The final movement studies the Qur'ānic concept of āyāt as a framework in which revelation, nature, history, and the human self can function as domains of indication. The conclusion is deliberately qualified: the Qur'ānic theistic framework possesses distinctive resources for unifying objective order, the possibility of knowers, epistemic normativity, and signification, though the inference remains open to philosophical criticism.

Keywords

readability; intelligibility; philosophy of science; scientific realism; mathematics; representation; consciousness; intentionality; information; meaning; semiotics; metaphysics; Qur'ān; āyah; āyāt

Methodological Note

This study combines conceptual analysis, comparative metaphysics, philosophy of science, and textual interpretation. These methods must not be confused. A scientific claim is evaluated by empirical and theoretical standards; a philosophical claim by clarity, validity, explanatory scope, coherence, and resistance to counterexample; a Qur'ānic claim by linguistic usage, local and canonical context, and responsible engagement with interpretive tradition. The manuscript does not infer theology from scientific equations, nor does it infer scientific theory from isolated verses.

The argument is primarily abductive. It does not claim that readability entails theism by strict deduction. It asks which metaphysical frameworks make the combined phenomenon less arbitrary and more intelligible. Abduction can be rational without yielding certainty, and a fair comparison must state the strengths of rival accounts before identifying residual explanatory problems.

Introduction — The Problem of a Knowable World

Reality is astonishingly available to inquiry. This availability is easy to overlook precisely because modern life presupposes it: instruments work, engineering succeeds, experiments are repeatable, and theoretical models routinely guide further intervention. Yet none of these practical successes follows simply from the human capacity to invent descriptions. The deeper, philosophically striking fact is that invention is constrained: countless descriptions are tried and discarded, while a subset survives increasingly demanding encounters with the world. Calling the world “readable” is an attempt to name this cluster of phenomena without collapsing it prematurely into any single metaphysical doctrine.

To say that reality is readable already compresses several distinct questions that must be teased apart. First, what sorts of things are in principle knowable? We may mean particulars — objects and events; structures such as spatial or functional organisation; causal powers or dispositions; laws and regularities; or only patterns in experience that are stable enough to be communicated. Each option points toward a different epistemic project. Structural realists, for example, emphasise the retention of relational structure across theory change ¹, whereas an empiricist anti-realist will insist that what matters are correctly prognosticative regularities in observable phenomena ².

Second, who or what counts as a knower? The knower can be modelled as an individual consciousness (the traditional epistemological subject), a scientific community whose practices stabilise and test claims (a sociological perspective influenced by Kuhn ³), an evolved organism whose behaviour tracks affordances, or, more abstractly, any information-processing system. Contemporary cognitive science complicates the picture still further by challenging the sharp divide between internalist and externalist conceptions of cognition ⁴. These differences matter: a theory of “readability” that predicates success on individual justification will have different implications from one that emphasises community validation or systemic fit.

Third, what is the relation between successful representation and truth? Philosophers have long contested whether success implies truth (robust scientific realism ⁵), whether it only implies usefulness (instrumentalism), or whether the relation is more subtle, for instance structural isomorphism without ontic commitment ⁶. Problems of underdetermination and theory change (Quine ⁷; Kuhn ⁸) show that empirical adequacy underdetermines metaphysical interpretation. Popper’s emphasis on falsifiability ⁹

¹James Ladyman and Don Ross, *Every Thing Must Go* (Oxford: Oxford University Press, 2007), 66–129. Umberto Eco, *A Theory of Semiotics* (Bloomington: Indiana University Press, 1976).

²Ladyman and Ross, *Every Thing Must Go*, 66–129.

³Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 4th ed. (Chicago: University of Chicago Press, 2012), 43–52.

⁴Andy Clark, *Supersizing the Mind* (Oxford: Oxford University Press, 2008), 1–82.

⁵Ladyman and Ross, *Every Thing Must Go*, 66–129.

⁶W. V. O. Quine, *Word and Object* (Cambridge, MA: MIT Press, 1960), 23–72.

⁷Quine, *Word and Object*, 23–72.

⁸Kuhn, *Structure of Scientific Revolutions*, 43–52.

⁹Karl Popper, *The Logic of Scientific Discovery* (London: Routledge, 2002), 57–73.

reframes success in terms of survivability under critical tests rather than in correspondence to an independent reality. These debates suggest that “readability” should be treated as an explanandum that can be accounted for in different ways, rather than as a term that settles the metaphysical question at the outset.

An information-theoretic perspective helps to make the phenomenon more precise without importing controversial metaphysics. If information is understood in the broad sense developed in Shannon’s formalism ¹⁰ and elaborated philosophically by Floridi and Dretske on semantic and epistemic roles of information ¹¹, then readability can be described as the capacity of the world to bear patterns that are both stably encoded and reliably decoded by observers or systems. Concrete examples make this less abstract: a thermometer encodes ambient temperature in a mechanical displacement that, given a calibration scheme, can be reliably read; language encodes propositions that can be interpreted by competent speakers; the regularities exploited in engineering encode relations that permit successful construction. In each case, the claim is not that the encoding is metaphysically privileged, but that the world affords patterns amenable to representation and control.

Objections divide along familiar philosophical fault-lines. The anti-realist worries that “readability” merely rebrands the pragmatic success of models; the realist replies that the persistence and transferability of representations across contexts requires some kind of mind-independent constraint on admissible descriptions (a point emphasised in debates about the “unreasonable effectiveness” of mathematics ¹² and the indispensability arguments concerning mathematical realism ¹³). Naturalists and reductionists may insist that readability is the product of brute causal structures and evolutionary tuning (Dennett ¹⁴; Nagel ¹⁵ raises challenges for purely mechanistic accounts), while those schooled in semiotics and hermeneutics draw attention to the interpretive loop in which signs gain meaning (Peirce ¹⁶; Eco ¹⁷). The philosophical demand is to articulate an account that can accommodate the reliability of intersubjective knowledge without dismissing the role of interpretation and theoretical choice.

For the present project the term *āyah/āyāt* from the Qur’ānic vocabulary is relevant because it presents a religiously normative way of framing the same phenomenon: reality as sign. Interpretations

¹⁰Claude E. Shannon, "A Mathematical Theory of Communication," Bell System Technical Journal 27 (1948): 379-423, 623-656.

¹¹Luciano Floridi, *The Philosophy of Information* (Oxford: Oxford University Press, 2011), 80–107. Fred Dretske, *Knowledge and the Flow of Information* (Cambridge, MA: MIT Press, 1981), 44–46.

¹²Ladyman and Ross, *Every Thing Must Go*, 66–129.

¹³Ladyman and Ross, *Every Thing Must Go*, 66–129.

¹⁴Daniel C. Dennett, *Darwin's Dangerous Idea* (New York: Simon & Schuster, 1995).

¹⁵Thomas Nagel, *Mind and Cosmos* (Oxford: Oxford University Press, 2012).

¹⁶Charles S. Peirce, *Philosophical Writings of Peirce*, ed. Justus Buchler (New York: Dover, 1955), 99.

¹⁷Eco, *Theory of Semiotics*.

in Islamic intellectual history range from contemplations of natural signs (Izutsu ¹⁸; Rahman ¹⁹) to metaphysical readings that situate signs within a broader devotional epistemology (al-Attas ²⁰). To introduce such theological resources responsibly in a philosophical account, however, requires that we first clarify the structure of readability on its own terms. A theological framework should not be protected from critical engagement by being placed before the data it seeks to interpret. Only after we have distinguished what is being read, who reads, and what counts as success may the Qur'ānic notion of āyāt be brought in as one interpretive vocabulary among others — one that emphasises signhood, purposive intelligibility, and ethical response, without claiming to settle the metaphysical disputes between naturalist, realist, or anti-realist perspectives.

In sum, the claim that reality is readable is an invitation to a multidisciplinary inquiry. It points to a robust empirical phenomenon — the constrained survivability of certain descriptions — and it opens several theoretical routes: information-theoretic accounts, semantic and pragmatic explanations, realist truth-tracking models, and theological interpretive frameworks. Each offers partial illumination; together they provide a plural yet disciplined conversation about why, how, and to whom the world yields its intelligibility.

Part I — The Phenomenon Before the Name

This part develops the monograph's central question by moving from the phenomenon of knowability to its conceptual, scientific, semantic, Qur'ānic, and metaphysical interpretation. The chapters are cumulative: each preserves the distinctions established earlier while testing them against a new domain.

Chapter 1 — The Success of Reading Reality

Scientific success should not be conflated with metaphysical certainty. A mature philosophical reading recognises two separable claims: first, that disciplined inquiry repeatedly establishes stable relations between representation and intervention; second, that such achievements do not by themselves licence wholesale ontological commitments to every posited theoretical entity. The first claim is descriptive of a pattern of practice — the way laboratories, instruments, and theoretical frameworks cohere to render parts of the world reliably “readable.” The second is a methodological caution that confronts both the history of science and classic philosophical objections to naïve realism.

To sharpen the point it helps to distinguish three layers of assessment. At the level of empirical adequacy we ask whether a theory correctly systematises observable regularities and yields useful predictions. At the level of intervention we attend to whether those systematisations allow

¹⁸Toshihiko Izutsu, *God and Man in the Qur'an* (Kuala Lumpur: Islamic Book Trust, 2002), 142–162.

¹⁹Fazlur Rahman, *Major Themes of the Qur'an*, 2nd ed. (Chicago: University of Chicago Press, 2009), 1–16.

²⁰Syed Muhammad Naquib al-Attas, *Prolegomena to the Metaphysics of Islam* (Kuala Lumpur: International Institute of Islamic Thought and Civilization, 1995), 14–16.

practitioners to manipulate conditions and produce reliable outcomes. At the ontological level we ask whether commitment to the reality of the theory's entities is warranted. These layers can come apart: a theory may be empirically adequate and interventionally powerful while remaining ontologically questionable. Instrumentalists have long insisted on this separation (cf. van Fraassen ²¹); the philosophical literature on scientific realism conversely emphasises the virtues of explanatory depth and convergent realism as grounds for ontological commitment (cf. Putnam ²²; Boyd ²³).

The phenomenon I call “readability” concerns the middle layer. Readability is the recurrent achievement by which a disciplined community brings representation and intervention into reliable alignment. It is not mere technological convenience: a device that works by accident or in narrowly contingent circumstances does not manifest the same epistemic status as a body of theory integrated into diverse practices and subject to corrective testing. The hallmark of readability is constrained convergence. Different approaches, when properly tuned and tested, tend to organise their predictions around invariant patterns rather than dissolving into arbitrary pluralism. This is visible in historical transitions where successor theories preserve the interventionally relevant structure of their predecessors even as they redescribe underlying mechanisms — think of how classical mechanics remains an excellent engineering resource despite being subsumed by relativistic and quantum frameworks in appropriate domains (cf. Kuhn ²⁴; Popper ²⁵).

Corrigibility is not an embarrassment to this claim but one of its confirmations. The fact that experiments frustrate expectations, that instruments reveal calibration errors, and that rival models can be eliminated or restricted, shows that the world resists unchallenged projection; it supplies constraints that guide theory choice. Indeed, a counterfactual world in which every model received equal empirical support would be unreadable in any robust sense because no practical or epistemic distinctions could be made. Philosophically, this resistance is the raw material from which constrained convergence grows: theories are disciplined not only by human desiderata but by the pushback of a world that responds differentially to interventions (cf. Quine ²⁶; Popper ²⁷).

Predictable objections must be faced. The pessimistic meta-induction — the observation that many formerly successful theories were later abandoned — threatens to dissolve any inference from success to truth. Underdetermination of theory by data suggests that multiple, incompatible theoretical structures can fit the same phenomena (cf. Quine ²⁸). Equally, anti-realists maintain that empirical adequacy suffices for scientific practice and that metaphysical commitments are dispensable (cf. van

²¹Bas C. van Fraassen, *The Scientific Image* (Oxford: Oxford University Press, 1980), 12.

²²Hilary Putnam, *Mathematics, Matter and Method* (Cambridge: Cambridge University Press, 1975), 60–78.

²³Richard Boyd, “The Current Status of Scientific Realism,” in *Scientific Realism*, ed. Jarrett Leplin (Berkeley: University of California Press, 1984), 41–82.

²⁴Kuhn, *Structure of Scientific Revolutions*, 43–52.

²⁵Popper, *Logic of Scientific Discovery*, 57–73.

²⁶Quine, *Word and Object*, 23–72.

²⁷Popper, *Logic of Scientific Discovery*, 57–73.

²⁸Quine, *Word and Object*, 23–72.

Fraassen ²⁹). These are serious rejoinders. Yet they do not erase constrained convergence. Even if ontological caution is appropriate, the pattern whereby independent lines of inquiry converge on mutually compatible interventions and representations remains a distinctive feature of our epistemic situation — one that philosophers of science have modelled as a form of local realism or structural realism rather than global metaphysical certainty (cf. Putnam ³⁰; Boyd ³¹; Ladyman ³²).

Additional complications arise when we place consciousness and meaning at the centre of inquiry. Some thinkers argue that cognitive and semantic frameworks shape what counts as readable, so that human cognitive architecture imposes an ineliminable interpretive lens (cf. Nagel ³³; Chalmers ³⁴; Dennett ³⁵). This anthropocentric worry is not trivial: perceptual and linguistic faculties influence hypothesis formation and theory choice. Nonetheless, the role of corrigibility and interventional feedback mitigates a purely subjectivist reading. When different observers, employing diverse methods, obtain recurrently the same interventionally relevant results, the hypothesis that there is an external constraint operative — a form of readability — gains credibility irrespective of deep disagreements about consciousness.

A fruitful cross-tradition dialogue can be sustained by recognising that the Qur'ānic notion of āyāt — “signs” that invite reflection and guide moral and cognitive response — maps conceptually onto this philosophical idea of readability without collapsing one into the other. The Qur'ānic discourse repeatedly frames the world as legible in ways that prompt human engagement rather than as a text that proves specific scientific doctrines (cf. The Qur'ān ³⁶; Izutsu ³⁷; Rahman ³⁸; Al-Attas ³⁹). Readability, so construed, is compatible both with religious talk of āyāt as signposts and with rigorous naturalistic accounts of constrained convergence and corrigibility. Neither side need overreach: scientific success does not prove theological claims, nor does religious meaning negate the autonomy of methodological critique.

Taken together, the claim advanced here is modest and philosophically disciplined. Scientific success exemplifies a recognisable epistemic phenomenon — disciplined, corrigible mastery of representational tools that reliably organise intervention. This phenomenon establishes the world's readability insofar as it produces constrained convergence and persistent feedback that rules out arbitrary projection. That pattern admits multiple philosophical readings: it is compatible with forms of realism cautious about ontological commitment, with instrumentalist emphases on empirical

²⁹van Fraassen, *Scientific Image*, 12.

³⁰Putnam, *Mathematics, Matter and Method*, 60–78.

³¹Boyd, "Current Status of Scientific Realism," 41–82.

³²Ladyman and Ross, *Every Thing Must Go*, 66–129.

³³Nagel, *Mind and Cosmos*.

³⁴David J. Chalmers, *The Conscious Mind* (Oxford: Oxford University Press, 1996).

³⁵Dennett, *Darwin's Dangerous Idea*.

³⁶Izutsu, *God and Man in the Qur'an*, 142–162.

³⁷Izutsu, *God and Man in the Qur'an*, 142–162.

³⁸Rahman, *Major Themes of the Qur'an*, 1–16.

³⁹al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

adequacy, and with religiously informed notions of the world as meaningful āyāt. The upshot is not dogmatic realism but an evidential humility grounded in the demonstrable capacity of inquiry to render parts of reality intelligible and manipulable, while remaining open to revision and plural interpretive frameworks.

Chapter 2 — A World Available to Inquiry

The phenomenon I call the "readability of reality" is best understood not as a single property but as a structure that requires four interdependent dimensions: objective pattern, epistemic access, constraint, and integration. To read is to detect and register patterns; but pattern alone—regularity without any doorway into it—would be unreadable. Likewise, having sensory or cognitive access to something does not suffice for reading if what is accessed can be reshaped at will by the reader. Constraint is what separates discovery from fabrication; integration is what explains why readings retain value beyond a particular moment, interpreter, or discipline.

By "objective pattern" I mean repeatable, recognisable structure in the world that is, in principle, independent of any particular observer. This is the dimension appealed to by scientific realism, which treats structures uncovered by science as more than mere instruments for organising experience ⁴⁰. Critics of realism rightly warn that apparent structure can be theory-laden or ephemeral ⁴¹; the point here is modest: without some regularity in the world, there would be nothing for any method to track. The epistemic-access dimension picks up the other side of the relation: it encompasses the perceptual, experimental, and conceptual capacities that allow agents to detect patterns. Epistemic access includes not only raw sensation but also the technologies, languages, and methods that enable subtler discriminations—microscopes, statistical tools, and mathematical formalisms among them.

Constraint is the dimension that prevents reading from being merely a projection of the reader's fancy. Constraint may be formal (as when a theory yields precise, testable predictions), probabilistic (as when statistical models limit acceptable inferences), or normative (as when community standards exclude ad hoc rescue devices). Popper's emphasis on falsifiability captures one strand of this idea: a genuinely constrained claim exposes itself to potential defeat by the world ⁴². Constraint is also informational: a hypothesis that compresses data more effectively or carries less arbitrary baggage is preferable, echoing notions in information theory that concern redundancy and coding ⁴³. Without constraints, any narrative can be made to fit any set of observations, collapsing the distinction between reading and inventing.

Integration addresses how readings travel across contexts, tools, and generations. A local regularity becomes epistemically powerful when it coheres with other domains—mathematical law connecting disparate phenomena, a model that unifies observation at different scales, or an interpretive principle that survives translation between cultures. Kuhn's account of scientific change highlights both the

⁴⁰Eco, *Theory of Semiotics*.

⁴¹Popper, *Logic of Scientific Discovery*, 57–73. Kuhn, *Structure of Scientific Revolutions*, 43–52.

⁴²Popper, *Logic of Scientific Discovery*, 95–120.

⁴³Shannon, "Mathematical Theory of Communication." Floridi, *Philosophy of Information*, 80–107.

integrative triumphs and the breakdowns of paradigms: genuine integration enhances portability of results; lack of integration leads to fragmentation ⁴⁴. Integration also accounts for the apparent surprise that mathematics can so often be applied fruitfully in physical theory, a puzzle emphasised by Wigner but not reducible to miracle: when conceptual frameworks and empirical regularities align, explanatory and predictive power can emerge across previously disjointed domains ⁴⁵.

These dimensions taken together make readability relational but not subjectivist. Relationality means that to assess readability we must attend to the relation between a world that bears patterns and agents capable of grasping them; but recognising this relation does not licence epistemic relativism. A wholly subjectivist account would reduce readings to mere reports of appearances; a wholly objectivist account would ignore the role of interpretive apparatus. The analog of visibility clarifies this middle way: an object is visible only if it has form (pattern), light reaches it (access), it reflects in constrained ways (constraint), and observers share standards for reporting what they see (integration). Visibility is not merely in the mind of the beholder, nor wholly independent of perceivers.

Several objections deserve attention. Radical constructivists might insist that all apparent constraints are constructed by interpretive communities; sceptics may claim that epistemic access is always so theory-laden that "pattern" is an illusion. These objections are serious and demand that claims of readability avoid naïve empiricism. Yet they do not entail that nothing corresponds to the world; rather, they prompt rigorous specification of the standards and methodologies that secure intersubjective agreement—standards found in robust experimental protocol, mathematical coherence, and the replication of results across independent lines of inquiry ⁴⁶. Naturalists who reduce meaning to causal or functional relations can be accommodated within this framework by treating meaning as a relation that includes informational and syntactic dimensions ⁴⁷, while anti-realist perspectives remind us that attributions of mind-independent structure carry philosophical burden and must be argued.

From an Islamic perspective, the Qur'ānic notion of āyāt—signs dispersed in scripture and creation—illustrates the same fourfold structure without converting it into a proof of theology. The Qur'ān invites reflection on patterns in nature and text that point beyond themselves, yet it also expects competent interpretive labour, communal standards, and integration between textual exegesis and natural observation ⁴⁸. Thoughtful Muslim philosophers have long emphasised the interplay between divine signs and human epistemic capacities while cautioning against facile equation of scientific success with theological verification ⁴⁹.

⁴⁴Kuhn, *Structure of Scientific Revolutions*, 43–52.

⁴⁵Ladyman and Ross, *Every Thing Must Go*, 66–129.

⁴⁶Popper, *Logic of Scientific Discovery*, 57–73. Kuhn, *Structure of Scientific Revolutions*, 43–52.

⁴⁷Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

⁴⁸The Qur'an: A New Translation, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004). Rahman, *Major Themes of the Qur'an*, 65–79. Izutsu, *God and Man in the Qur'an*, 142–162.

⁴⁹Rahman, *Major Themes of the Qur'an*, 1–16.

Drawing these threads together, to say reality is readable is neither to assert a naïve correspondence nor to dissolve reading into pure construction. Readability is a constrained relation between worldly patterns and epistemic capacities that is sustained and amplified by integrative practices. A robust account must attend simultaneously to the ontology of pattern, the sociology and epistemology of access, the methodological limits that restrain arbitrary interpretation, and the ways in which knowledge coheres across time and context. Only by keeping these four dimensions in view can we navigate debates among naturalists, realists, anti-realists, and religious interpreters without conflating pragmatic success with metaphysical proof.

Chapter 3 — Naming the Phenomenon: Readability

The proposed term must justify itself against a well-populated conceptual field. “Intelligibility” has a long pedigree in philosophy, from Aristotle’s enquiries into nature’s reasons or causes ⁵⁰ to Kant’s account of the conditions that make experience possible ⁵¹. Intelligibility asks, fundamentally, whether reality admits of understanding — whether there are principled explanations, reasons, or conceptual schemes that render experience coherent. Readability, by contrast, shifts analytical emphasis from the existence of conceptual order to the practical and epistemic pathway by which that order becomes discoverable, representable, criticizable, and reusable. It is not offered as a replacement for intelligibility but as a supplementary notion aimed at explanatory work: to account for how agents — human, technological, or collective — reliably extract structure from the world such that knowledge practices can proceed.

A working definition: readability is the objective availability of stable aspects of reality to constrained and corrigible processes of discovery through which epistemic agents can form, test, revise, and integrate representations. Each phrase in that definition encodes a philosophical move and admits necessary distinctions. “Objective availability” is not metaphysical naïvety; it marks a domain of phenomena that are not wholly idiosyncratic to one observer’s psychology. Stability indicates repeatability and regularity across contexts sufficient to support intersubjective communication and predictive practice. “Constrained processes” invokes procedures or methods that limit degree of freedom in interpretation — for example, formal procedures, experimental controls, or shared hermeneutical rules — and thereby reduce purely arbitrary readings. “Corrigible” gestures toward Popperian fallibilism: claims must be in principle revisable and testable ⁵². Finally, the functional catalogue — formation, testing, revision, integration — situates readability within the social and cognitive activities constituting scientific and interpretive inquiry.

The information turn in philosophy illuminates part of this account. Shannon’s formal theory foregrounds the idea of a channel that reliably conveys signals under noise constraints ⁵³; Floridi and

⁵⁰Aristotle, *Physics*, trans. C. D. C. Reeve (Indianapolis: Hackett, 2018), 194b17–20.

⁵¹Immanuel Kant, *Critique of Pure Reason*, trans. Paul Guyer and Allen W. Wood (Cambridge: Cambridge University Press, 1998).

⁵²Popper, *Logic of Scientific Discovery*, 95–120.

⁵³Shannon, “Mathematical Theory of Communication.”

Dretske show how information content and its transmission relate directly to epistemic access and representation ⁵⁴. These resources help to distinguish mere pattern-perception from genuine readability: a sequence of correlated events only counts as readable if there exist procedures that reduce noise, discriminate relevant variables, and produce representations that survive intersubjective criticism and reuse. Semiotic traditions — Peirce’s pragmatic account of signification and Eco’s semiotics — further remind us that meaning emerges in triadic relations among sign, object, and interpretant, which dovetails with the idea that readability is realized within communicative and inferential practices, not solely in isolated bouts of perception ⁵⁵.

Objections may be raised on several fronts. A naturalist might worry that readability smuggles in normative or purpose-laden notions — that it attributes an epistemic favouring of discoverability incompatible with a blind, mechanistic universe. A theist or Islamic interpreter might conversely argue that readability is simply the Qur’ānic doctrine of creation as *āyāt* — signs pointing to God — thereby collapsing the analytic term into a theological thesis. An anti-realist or constructive empiricist will insist that what counts as readable is always theory-laden and contingent upon accepted scientific practice ⁵⁶. These objections are real and instructive. Readability, as proposed, seeks a middle course: it neither claims that the world is literally a language nor asserts that every phenomenon is intentionally encoded. It allows that human cognitive and social practices condition what is readable, while also maintaining that there are constraints external to any one conceptual scheme — constraints that can be appealed to in intersubjective critique and in the comparative evaluation of competing models.

Historical examples underscore this nuance. The successive accounts of planetary motion show that patterns once inscrutable become readable given new conceptual tools and methods; Kuhn’s analysis of paradigm shifts illustrates how changes in standards of evidence and explanatory style reconfigure what appears readable within normal science ⁵⁷. Wigner’s well-known reflection on the “unreasonable effectiveness” of mathematics highlights the remarkable match between formal structures and physical phenomena, a fact that any account of readability must accommodate without treating that match as metaphysical proof of providence ⁵⁸. Conversely, van Fraassen and other anti-realists warn that scientific images are not transparent windows on a mind-independent reality but constructed representations whose “readability” depends on pragmatic and empirical virtues ⁵⁹.

An Islamic perspective enriches rather than collapses the notion. The Qur’ān repeatedly speaks of the natural world as *āyāt* — signs that invite reflection, without prescribing a specific modern scientific

⁵⁴Floridi, *Philosophy of Information*, 80–107. Dretske, *Knowledge and the Flow of Information*, 44–46.

⁵⁵Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

⁵⁶Kuhn, *Structure of Scientific Revolutions*, 43–52. Quine, *Word and Object*, 23–72.

⁵⁷Eco, *Theory of Semiotics*.

⁵⁸Eugene P. Wigner, "The Unreasonable Effectiveness of Mathematics in the Natural Sciences," *Communications in Pure and Applied Mathematics* 13 (1960): 1-14. Seyyed Hossein Nasr, *An Introduction to Islamic Cosmological Doctrines* (Cambridge, MA: Harvard University Press, 1964).

⁵⁹Qur’ān 3:190–191; 41:53; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

methodology⁶⁰; classical and modern commentators, from Izutsu to Rahman and Al-Āttās, have emphasised the polyvalent semiotic status of these signs, which require interpretive labour and moral attentiveness rather than simplistic literalisation⁶¹. Readability, thus, can be read as a conceptual bridge: it respects the Qur'ānic intuition that the world bears sign-like features while insisting that the recognition of those signs depends on constrained, corrigible epistemic practices.

On balance, readability is a modest, practice-oriented concept that complements existing notions of intelligibility. It draws attention to the procedural conditions — stability, constraints, corrigibility, intersubjective testability — that make certain regularities in nature discoverable and usable. It is compatible with a spectrum of metaphysical positions: naturalists can treat it as an account of method; realists can take it as evidence of mind-independent structure; anti-realists can interpret it as the codification of practice; Islamic thought can see it as consonant with the Qur'ānic idea of āyāt without reducing scripture to empirical claim. The virtue of the term will depend on its ability to illuminate particular disputes about explanation, representation, and meaning; its next task is to be operationalized in specific case studies in the philosophy of science and in Qur'ānic hermeneutics, always guarded by the principle of corrigibility.

Part II — Why Readability Is a Philosophical Problem

This part develops the monograph's central question by moving from the phenomenon of knowability to its conceptual, scientific, semantic, Qur'ānic, and metaphysical interpretation. The chapters are cumulative: each preserves the distinctions established earlier while testing them against a new domain.

Chapter 4 — Readability, Order, Intelligibility, and Information

A recurring question deserves direct treatment: is readability simply a new name for intelligibility, knowability, discoverability, or representability? Each neighbouring concept captures part of what readability names, but none captures the whole. Intelligibility asserts only that reality is in principle graspable by reason; it says nothing about whether that graspability survives sustained testing. Knowability asserts that facts are in principle accessible to a knower, but leaves open whether access is corrigible or merely asserted. Discoverability adds a temporal dimension—truths can be brought to light through inquiry—but does not by itself require that discoveries be cumulative or cross-checkable across independent methods. Representability adds the further requirement that reality submit to symbolic or structural modelling, but a world could be representable in disconnected, ad hoc ways without exhibiting the constrained convergence discussed above. Readability is the conjunction and intensification of these commitments: not a static property but a recurrent achievement, in which

⁶⁰Qur'ān 2:164; 3:190–191; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁶¹Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 1–16. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

representation and intervention repeatedly align, survive correction, and transfer across otherwise independent methods of inquiry.

Concept	Core claim	Relation to readability
Intelligibility	Reality is graspable by reason as such.	Necessary background condition; readability presupposes intelligibility but adds constraint and corrigibility.
Knowability	Facts about reality are in principle accessible to a knower.	Readability requires knowability but specifies the epistemic mode: representation-based and testable.
Discoverability	Unknown truths can be brought to light through inquiry.	Readability includes discoverability but adds that discovery be cumulative and cross-checkable.
Representability	Reality can be modelled by symbols or structures.	Readability requires representability but adds that representations remain corrigible and integrative across methods.
Readability	The recurrent, corrigible alignment of representation and intervention across a plurality of methods.	The synthesis: combines the above into a single relational, dynamic achievement rather than a static property.

Order, intelligibility, information, and readability are often treated as synonyms in ordinary discussion, but careful philosophical analysis shows they pick out distinct strata of relation between the world and minds that attend to it. Order names a pattern of regularity in the constitution or behaviour of things — the crystal lattice, planetary orbits, or the periodic recurrence of climatic oscillations. Order can be given a long pedigree in philosophical thought (cf. Aristotle's enquiries into nature)⁶²; it is a structural claim about what co-occurs or what follows from what. Intelligibility shifts attention from mere pattern to grasp: it denotes the capacity of reason to render that pattern into concepts, laws or principles, to place it within a framework that makes sense of it. Intelligibility therefore carries epistemic ambition: to render order intelligible is to provide reasons, explanations, or conceptual articulations that a rational agent can hold and refine.

⁶²Aristotle, *Physics*, 194b17–20.

Information, in contrast, is a still more formal notion. In its narrow, technical sense — as developed in Shannon's theory — information measures differences that reduce uncertainty in a specified channel independent of semantic content ⁶³. Philosophers and theorists have usefully elaborated how such formal information may or may not become semantic information, that is, information that bears about states of affairs and thereby acquires content (see Dretske on information and the flow toward knowledge) ⁶⁴. Floridi's philosophy of information offers an even broader framework for thinking about the ontology and epistemology of information as the stuff with which representations are constituted ⁶⁵. The point of these distinctions is simple but often overlooked: differences and regularities can be quantified and manipulated without thereby becoming meaningful propositions or bearing intentional content.

Readability is the hybrid category that concerns us here. It occupies the intersection where objective differences — patterns and informational states — are not merely present but become available to epistemic practices capable of representation, correction, and communication. A readable phenomenon is one that not only reduces uncertainty in a formal sense, but also can be encoded, interpreted, and criticised by a community of inquirers. Consider two contrasts. A quartz crystal exhibits order; its lattice reduces entropy in a technical sense, but without an interpretive practice it does not constitute a signal to anyone. A sequence of marks in Morse code is information that, within a cultural practice of encoding and decoding, becomes readable as a proposition. Likewise, the genetic sequence of DNA is formally information, but it becomes semantically potent only when embedded in cellular machinery and interpreted within biological developmental systems. These examples show that the move from order to meaning passes through at least two transitions: from structure to formal information, and from formal information to semantic content through practices of representation and correction.

Why does this taxonomy matter for philosophical and theological argument? Because arguments that rush from the existence of physical regularity to claims about meaning, purpose, or divine communication conflate distinct transitions. A regularity does not yet signify; a signal does not yet state a proposition about ultimate ends; a successful predictive model does not by itself establish metaphysical purposiveness. Scientific realists, anti-realists, and naturalists will deploy different resources to interpret these transitions. Realists may insist that the regularities and theoretical entities posited by science describe mind-independent structures (cf. Putnam and the realist literature) ⁶⁶. Anti-realists or constructive empiricists will emphasise the role of models, empirical adequacy, and the pragmatic practices of science (cf. van Fraassen, Kuhn) ⁶⁷. Naturalists can accept the presence of formal information and the success of representational practices without thereby conceding

⁶³Shannon, "Mathematical Theory of Communication."

⁶⁴Dretske, *Knowledge and the Flow of Information*, 44–46.

⁶⁵Floridi, *Philosophy of Information*, 104.

⁶⁶Putnam, *Mathematics, Matter and Method*, 60–78. van Fraassen, *Scientific Image*, 12.

⁶⁷van Fraassen, *Scientific Image*, 12. Kuhn, *Structure of Scientific Revolutions*, 43–52.

metaphysical teleology. Each position points to legitimate constraints: metaphysical or theological inference requires more than an appeal to regularity; it requires justification of the interpretive leap.

Islamic theological discourse, in interpreting the Qur'ānic concept of āyāt, provides a paradigmatic case of how such distinctions are handled. The Qur'ān repeatedly invites reflection on signs (āyāt) in nature and history, presented as prompts to intelligibility and moral response rather than as raw data to be uncritically reified (see translations and commentary that emphasise signhood)⁶⁸. Classical Muslim philosophers and theologians debated whether natural order indicates providence or is explicable wholly by secondary causality; Al-Ghazālī and Ibn Rushd offer contrasting approaches to causation, reason, and interpretation that illuminate the methodological caution required when moving from physical order to purpose⁶⁹. Contemporary metaphysical reflections within Islamic thought, such as those in Al-Attas, insist on a layered ontology in which signs invite interpretive labour rather than forcing a single definitive reading⁷⁰.

Objections to the above taxonomy are foreseeable. One might argue that information, properly understood, already carries semantic import and so the separation is artificial; Dretske's project aims to narrow that gap but also acknowledges the need for causal and interpretive connections⁷¹. A sceptic may maintain that 'readability' merely redescribes human cognitive capacities and adds nothing metaphysical; yet the concept is analytic: it marks a relational property between worldly difference and the norms of representation, validation, and correction that epistemic communities endorse. Another objection is that the distinctions privilege human practices; proponents of pan-semantic or pan-interpretive views would resist. These debates are substantive, and the taxonomy offered here is meant as analytic scaffolding rather than as a metaphysical pronouncement.

The methodological conclusion is modest but important. Any argument that ascribes meaning, purpose, or divine authorship to features of the world must make explicit the transitions it invokes: from order to information; from information to semantic content; and from semantic content to purposive significance. Recognising these levels respects the plurality of epistemic positions — naturalist, realist, anti-realist, and Islamic — and preserves room both for scientific inquiry and for theological interpretation. It grounds the Qur'ānic appeal to āyāt in a conceptually disciplined account of reading reality: the world offers signs, but readability depends on interpretive practices that can represent, be corrected, and be held intelligible to reason.

Chapter 5 — Is Readability a Brute Fact?

⁶⁸Qur'ān 2:164; 3:190–191; 30:20–25; 12:111, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁶⁹al-Ghazālī, *Incoherence of the Philosophers*, 166–167. Ibn Rushd (Averroes), *The Decisive Treatise*, trans. Charles E. Butterworth (Provo: Brigham Young University Press, 2001), 1–9.

⁷⁰al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

⁷¹Dretske, *Knowledge and the Flow of Information*, 44–46.

One may consistently adopt a brute-fact posture: the world simply is as it is, and the patterns that permit scientific description and cognitive tracking require no further metaphysical justification. That position is logically available and has intuitive appeal. Philosophy cannot by fiat forbid terminating an explanatory chain at some explanatorily primitive node. The more pertinent question is comparative and pragmatic: where should explanation reasonably stop, and what is gained or forfeited by taking the world's intelligibility as primitive rather than as itself in need of explanation?

This chapter proposes that the “readability” of reality — the capacity of the world to present stable, discoverable patterns that information-bearing systems can register, encode, and exploit — is a promising candidate for a deeper explanandum. To see why, it helps to distinguish three different kinds of explanatory target. First, there are local regularities or laws: particular claims about planetary motion, chemical affinity, or gene frequencies. Second, there are mechanisms and agents that exploit those regularities: the sensory and cognitive architectures of organisms or the instruments and inferential practices of scientists. Third, there are background conditions that make the first two intelligible at all: the very fact that the world admits reliable patterns, that those patterns are representable, and that information flow between world and cogniser is possible. Explaining a law typically presupposes that laws can be investigated; explaining cognition presupposes an environment with trackable patterns. Readability is thus a background condition of inquiry rather than merely another local fact to be explained after the fact.

Two clarifying distinctions help prevent equivocation. One is ontic versus epistemic readability. Ontic readability would be the claim that the world itself consists of structures or relations that make pattern-formation likely (an ontological feature). Epistemic readability, by contrast, concerns the constraints and capacities of knowers and theories — the extent to which cognitive or formal systems can extract or represent regularities. A second distinction is between information in the technical, Shannonian sense (channels, noise, capacity) and information in the semantic or meaningful sense (aboutness, content). The philosophical literature on information recognises both registers: Shannon's formalism illuminates transmission conditions⁷², while Floridi and Dretske explore the transition from signal to semantic content⁷³. Any account of readability must be sensitive to both: it must allow that the world is hospitable to signal transmission and that such signals can be interpreted as carrying content.

Several pragmatic considerations make pursuing an account of readability attractive. Scientific practice itself presupposes it. The methodologies described by Popper and Kuhn presuppose that investigators can generate, test and revise representations that converge on stable regularities; scientific revolutions and falsifications are intelligible only if the world accords some degree of persistence to its patterns⁷⁴. The “unreasonable effectiveness of mathematics” provides a related, if more contested, datum: the striking success of abstract mathematical structures in generative scientific explanation suggests a

⁷²Shannon, “Mathematical Theory of Communication.”

⁷³Floridi, *Philosophy of Information*, 80–107. Dretske, *Knowledge and the Flow of Information*, 44–46.

⁷⁴Popper, *Logic of Scientific Discovery*, 57–73. Kuhn, *Structure of Scientific Revolutions*, 92–110.

congruence between the formal systems we devise and the relations instantiated in nature ⁷⁵. Whether one reads this congruence as evidencing a deep metaphysical affinity or as an epistemic selection effect is a substantive dispute; either way, the fact to be accounted for remains the same: our theories work often enough to make inquiry possible.

Objections are predictable and must be taken seriously. A naturalist may insist that no special metaphysical account of readability is required because evolutionary and selectional processes suffice: cognitive systems that happened to latch on to reliable environmental cues survive, so our epistemic successes are the product of contingent histories rather than of a world whose intelligibility demands metaphysical explanation ⁷⁶. An anti-realist or constructive empiricist will reply that we ought to be content with empirical adequacy; worrying about ontic readability commits us to metaphysical excess ⁷⁷. A proponent of sceptical modesty can appeal to Occam's razor: postulating an extra explanatory layer for readability is ontologically expensive.

These objections have force, but they do not dissolve the question. Evolutionary selection explains why particular organisms track particular cues, but it presupposes that cues exist and are stable enough to be exploited. Anti-realism reframes the problem as one of epistemic modesty but leaves unexplained why epistemic instruments so often succeed in securing empirical adequacy. Occam's razor is a tool for preference among hypotheses, not a metaphysical arbiter that settles explanatory importance. What is at stake is explanatory depth and coherence: a thesis that treats readability as itself in need of explanation promises a unified account of why information can be generated, transmitted and made meaningful — an account that naturalists, realists and anti-realists can test against competing frameworks.

It is also important to situate the philosophical question within other interpretive traditions. In the Qur'ānic idiom, the world is repeatedly described as replete with āyāt — signs that invite reflection and interpretation ⁷⁸. Classical Islamic commentators articulate a hermeneutic in which the observable order manifests rationally accessible signs pointing beyond immediate appearances (see Izutsu, Rahman, Al-Attas for formulations of this theme) ⁷⁹. That theological register should not be read as a scientific hypothesis asserting empirical proof, but as a proto-philosophical claim about the intelligibility of the universe: it foregrounds the interpretive orientation that underwrites scientific and moral inquiry alike.

Synthesizing these points, recognising readability as a philosophically interesting explanandum reframes familiar disputes. It neither compels a theistic conclusion nor negates naturalistic strategies;

⁷⁵Wigner, "Unreasonable Effectiveness of Mathematics."

⁷⁶van Fraassen, *Scientific Image*, 12.

⁷⁷van Fraassen, *Scientific Image*, 12.

⁷⁸Qur'ān 3:190–191; 41:53; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁷⁹Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 1–16. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

instead it highlights a background condition that any satisfactory account of science, cognition, or meaning must accommodate. Whether one will ultimately explain readability in terms of selectional histories, structural features of the world, constraints on cognition, or theological doctrine remains an open, substantive choice. What matters for philosophy of science and for comparative reflection is to make the question explicit, specify the conceptual stakes (ontic versus epistemic, signal versus semantic), and subject competing accounts to the methodological demands of coherence, scope, and parsimony. Only in that comparative spirit can we judge whether the readability of reality is a brute primitive or an invitation to a deeper explanatory project.

Chapter 6 — The Burden of Explanation

No metaphysical account should be judged by the felt certainty it affords alone. Certainty is a psychological datum: useful, for motivational and practical purposes, but analytically separate from the kinds of justificatory and heuristic virtues that make a metaphysical framework philosophically and scientifically productive. I propose five such virtues by which rival accounts — whether naturalist, realist, anti-realist, or Islamic — should be assessed: scope, depth, coherence, parsimony, and fruitfulness. These are not independent; they trade off against one another, and disagreements about metaphysics often reduce to different weightings of these virtues.

Scope asks whether an account addresses the conjunction of structure, access, normativity, and signification. A satisfying framework does not merely posit entities; it explains how we come to know them (access), how they are organised (structure), how they give rise to normative claims (normativity), and how they carry meaning (signification). For example, a strictly reductive naturalism that explains structural relations among physical systems but offers no account of how such relations ground meaning or moral normativity is limited in scope. Conversely, an overly expansive metaphysics that purports to explain everything by invoking an unanalyzable principle may sacrifice explanatory control. The Qur'ānic concept of *āyah/āyāt* — commonly rendered as “signs” or “verses” — exemplifies an attempt to bind structure and signification: the text continually treats features of the cosmos as bearing intelligible significance for human conduct and knowledge (see ⁸⁰; cf. ⁸¹, ⁸²).

Depth concerns unification: can apparently disparate phenomena be explained under fewer, more general principles? Depth is the philosophical analogue of explanatory power. A theory that unifies consciousness, information flow, and semantic content under a coherent formalism achieves depth; an ad hoc assemblage of domain-specific accounts does not. Debates over depth appear in contemporary discussions of information and meaning: Shannon's formal account of communication isolates syntactic information but leaves semantic content unaccounted for (⁸³); Floridi and Dretske provide philosophical bridges between information and semantic content without claiming a single,

⁸⁰Qur'ān 2:164, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁸¹Qur'ān 3:190–191, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁸²Qur'ān 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁸³Shannon, "Mathematical Theory of Communication."

simplistic reduction (⁸⁴, ⁸⁵). Depth does not require reduction to physics alone; it requires principled reduction or principled integration.

Coherence tests whether an account's ontology and epistemology undermine each other. Here refusals of coherence often go unnoticed. An ontological commitment to mind-independent moral facts that are cognitively inaccessible yields a tension: if our epistemic faculties are evolved biological systems explained by natural selection, how are they reliably connected to such facts? Similar tensions arise in accounts that either make consciousness epiphenomenal (thus removing its normative or intentional efficacy) or render intentionality inexplicable within physicalist metaphysics. These problems motivate non-reductive or dual-aspect approaches endorsed by some philosophers of mind (⁸⁶, ⁸⁷, ⁸⁸) and were central to medieval Islamic debates about God, providence, and human knowledge (cf. ⁸⁹, ⁹⁰, ⁹¹).

Parsimony counts unnecessary commitments without begging that the fewest nouns are automatically correct. The virtue is methodological economy: do not multiply entities beyond explanatory need. Yet parsimony must be sensitive to explanatory deficits: eliminating parameters that are explanatorily indispensable is not parsimonious in any useful sense. Quine's admonition about ontology and Popper's insistence on bold conjectures both play into how we apply parsimony: we should not favour the simplest metaphysics if it cannot accommodate the phenomena that scope and depth highlight (⁹², ⁹³).

Fruitfulness is the pragmatic criterion. Does the framework open disciplined inquiry, suggest novel problems, and generate testable predictions or interpretive heuristics? Thomas Kuhn's account of scientific revolutions reminds us that a theory's worth is partly its capacity to organise a research programme (⁹⁴). Fruitfulness is how metaphysics becomes generative rather than terminative. An information-theoretic perspective, for instance, trades on Shannon's formalism to generate inquiries into computation, cognition, and semiotics (linking ⁹⁵ with semiotic resources by Peirce and Eco) while also inviting theological or existential readings of "readability" where āyāt function as interpretive prompts rather than empirical proofs (⁹⁶, ⁹⁷, ⁹⁸).

⁸⁴Dretske, *Knowledge and the Flow of Information*, 44–46.

⁸⁵Dretske, *Knowledge and the Flow of Information*, 44–46.

⁸⁶Chalmers, *Conscious Mind*.

⁸⁷Chalmers, *Conscious Mind*.

⁸⁸Chalmers, *Conscious Mind*.

⁸⁹Eco, *Theory of Semiotics*.

⁹⁰Eco, *Theory of Semiotics*.

⁹¹Eco, *Theory of Semiotics*.

⁹²Popper, *Logic of Scientific Discovery*, 57–73.

⁹³Popper, *Logic of Scientific Discovery*, 57–73.

⁹⁴Kuhn, *Structure of Scientific Revolutions*, 92–110.

⁹⁵Shannon, "Mathematical Theory of Communication."

⁹⁶*Qur'ān* 3:190–191, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁹⁷*Qur'ān* 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁹⁸*Qur'ān* 2:164, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

Objections occur at each turn. Naturalists may insist that parsimony and fruitfulness favour minimalist physicalism; anti-realists may prioritize coherence with epistemic humility; religious interpreters may insist on the priority of revelation for settling normativity and signification. None of these responses settles the matter. Instead, the five-criterion framework forces interlocutors to state their commitments and to show where their favoured account wins and where it concedes. For instance, an Islamic reading that treats the world as legible in āyāt gains scope and fruitfulness for moral and exegetical projects but must show how such legibility interfaces coherently with naturalistic explanations of cognition and perception — a challenge that is tractable without presupposing theological proofs.

Bringing these considerations together, evaluating metaphysical proposals requires pluralised judgment. One should prefer accounts that cover the requisite domains (scope), unify them under principled grounds (depth), avoid internal contradictions between ontology and knowledge claims (coherence), keep ontological commitments economical (parsimony), and stimulate disciplined inquiry (fruitfulness). These criteria do not guarantee truth; they aim at theoretical robustness and interdisciplinary communicability. Reading reality as a set of āyāt is one interpretive stance among many. It can be assessed with the same philosophical instruments as secular metaphysical projects; it may prosper or falter on the five virtues. The point is methodological: to make metaphysical debate substantive, avoid appeals to mere certitude and foreground the comparative virtues that make accounts explanatorily and investigatively valuable.

Part III — Reading Reality Through Science

This part develops the monograph’s central question by moving from the phenomenon of knowability to its conceptual, scientific, semantic, Qur’ānic, and metaphysical interpretation. The chapters are cumulative: each preserves the distinctions established earlier while testing them against a new domain.

Chapter 7 — Scientific Realism and the Success of Science

The proposal developed in this chapter is deliberately modest: reality is, in important respects, readable. By this I mean not that every mature scientific theory is true in a naïve metaphysical sense, nor that the success of science furnishes a shortcut to theology, but that the world exhibits constraints that make systematic discovery possible. Readability names a disposition of the world to yield regular, transferable patterns to inquiry — constraints that temper the underdetermination of theory by data and which recur across theoretical revolutions. Framing the claim at this modest level preserves room for a range of philosophical and theological interpretations while focusing attention on the phenomenon that any satisfactory account must explain.

To sharpen the notion it is useful to distinguish three related ideas that are often conflated in debates about realism. First, empirical success: the capacity of a theory to predict and to organise phenomena. Second, constrained discoverability: the existence of objective regularities or invariances that make induction, experiment and model-building tractable. Third, ontological commitment: the metaphysical

claim that the theoretical entities postulated by our best theories correspond to mind-independent structures. Readability is primarily a claim about the second. It says nothing categorical about the truth of particular theoretical claims; it insists instead that inquiry is not pursuing phantom patterns but is – through contingent methods and conceptual resources – repeatedly finding constraints that are robust and often portable from one conceptual framework to another.

This minimalism renders the concept congenial to both realist and anti-realist traditions. Scientific realists have long appealed to the predictive and explanatory virtuosity of mature science as evidence that theories latch onto reality; prominent defenders emphasise the continuity of success across theory change ⁹⁹. Anti-realists, by contrast, caution that empirical adequacy need not licence metaphysical belief in unobservable ontology and stress the historical underdetermination and paradigm shifts that reconfigure theoretical vocabularies ¹⁰⁰. Readability accepts the anti-realist admonition against naïve ontological inference but resists the extreme conclusion that any order we find is purely a product of our conceptual schemes. It supplies a datum — the recurrent discoverability of constraints — that both camps must accommodate, even as they disagree about its ultimate metaphysical implications.

Concrete scientific examples illustrate the point without overstating it. Kepler's laws and Newtonian mechanics provided powerful, transferable constraints on planetary motion that enabled accurate prediction and engineering applications. Subsequent theoretical change, notably general relativity, revised the ontological framing of gravity but did not render the Newtonian regularities meaningless; they proved to be approximations valid within a large, useful domain. Similarly, the periodicity organised by Mendeleev survived reinterpretation within quantum theory: the pattern endured while the theoretical underpinnings evolved. Such cases exemplify a form of transferability in which constraints persist even as explanatory vocabularies shift — a pattern that any account of scientific knowledge must explain, whether one is inclined toward realism, structural realism, or empiricism ¹⁰¹.

Several objections require careful response. Naturalists may argue that apparent readability is an artefact of cognitive evolution and methodological selection: scientists and their tools have been shaped to detect patterns that are useful for survival and manipulation, not to mirror metaphysical reality. Thinkers sympathetic to cognitive naturalism emphasise evolution, cultural selection and distributed cognition as explanantia for regularity detection ¹⁰². This objection is powerful, and it rightly prompts caution about over-reading the metaphysical import of scientific success. Readability does not deny the role of cognitive constraints; rather it asks us to recognise that constrained cognitive capacities and a materially structured world together make systematic inquiry feasible. A purely psychologistic explanation, which treats all regularities as projections of human cognitive architecture,

⁹⁹Ladyman and Ross, *Every Thing Must Go*, 66–129.

¹⁰⁰Ladyman and Ross, *Every Thing Must Go*, 66–129. Eco, *Theory of Semiotics*.

¹⁰¹Boyd, "Current Status of Scientific Realism," 41–82. Ladyman and Ross, *Every Thing Must Go*, 66–129. van Fraassen, *Scientific Image*, 12.

¹⁰²Dennett, *Darwin's Dangerous Idea*. Clark, *Supersizing the Mind*, 1–82.

wrestles with the same transferability problem: why should the products of our evolved minds repeatedly align with regularities that survive methodological and theoretical shifts?

A second objection, often raised by anti-realists, invokes theory-change and underdetermination: historical revolutions suggest that what we call ‘laws’ are theory-laden and contingent. If so, how can we assert stable constraints? The reply is to distinguish between the form and the interpretation of constraints. Revolutions commonly alter the conceptual lenses through which constraints are expressed without obliterating the empirical relations they capture. Kuhn’s and Popper’s insights about discontinuity and falsifiability, respectively, remain indispensable to philosophical clarity¹⁰³; they must be integrated with the observation that certain structural patterns — invariances, symmetries, conservation-like regularities — exhibit a durable presence across frameworks.

Finally, the notion of readability resonates with theological reading within Islam that treats the world as full of *āyāt*, signs that invite interpretation. Classical and modern Islamic commentators have emphasised the semiotic richness of creation and its capacity to point beyond itself¹⁰⁴. To be sure, recognising the world as readable in this theological sense is an interpretive move that goes beyond the philosophical modesty of constrained discoverability; the former offers meaning and purpose, while the latter is agnostic about ultimate significance. The two perspectives are compatible in the sense that both take seriously the intelligibility of the world; conflating them, however, would commit the familiar category error of deriving metaphysical or theological conclusions solely from the methodological success of science.

Stepping back, readability is a middle-level claim. It identifies a persistent feature of our epistemic engagement with nature — the existence of robust, transferable constraints that make inquiry possible — without adjudicating the metaphysical questions that follow. It thereby provides a common point of contact for naturalist, realist, anti-realist and religious readings, obliging each to account for why the world so often yields to systematic scrutiny while leaving open the interpretive choices about what that fact ultimately signifies.

Chapter 8 — Mathematics and Reality

Philosophers have long been impressed — sometimes disquieted — by the fact that abstract mathematical structures, developed for reasons internal to mathematics, later organise and predict empirical phenomena with striking precision. Wigner’s phrase “the unreasonable effectiveness of mathematics” captures the puzzle: why should formal relations discovered in the mind so frequently map onto the world in ways that go beyond mere convenience?¹⁰⁵ A common naturalistic line appeals to selection effects and historical co-development: mathematics and empirical science have co-evolved, scientists keep and refine those formalisms that work, and education transmits a corpus

¹⁰³Kuhn, *Structure of Scientific Revolutions*, 92–110. Popper, *Logic of Scientific Discovery*, 57–73.

¹⁰⁴*Qur’ān* 2:164; 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹⁰⁵Wigner, “Unreasonable Effectiveness of Mathematics.”

of tools tuned to prior successes. That account explains much of the survivorship and retrospective fit, but it does not fully answer why abstract relations repeatedly find non-trivial physical realisation rather than merely serving as useful fictions.

The notion of readability reframes the problem. Rather than asking whether the universe is literally a mathematical object, readability treats mathematical applicability as one species of structural access: a way in which investigators can isolate relations, manipulate them within a formal vocabulary, derive consequences that are not immediately empirical, and then subject those consequences to test. Readability highlights the epistemic operation — the extraction and segmentation of relational patterns from a milieu — rather than immediately committing to a metaphysical thesis about the ultimate constitution of reality. This shift permits several analytic distinctions that clarify debates between realists, anti-realists, naturalists, and religious interpreters.

First, distinguish ontic from epistemic claims. An ontic claim would assert that reality is essentially mathematical (a strong Platonist or mathematical-universe thesis). An epistemic claim asserts only that mathematics is an especially powerful representational language for certain structures, enabling genuine discovery. Readability favours the latter: mathematics functions as a mode of structural access without thereby proving that mathematical entities exist independently of the world. This epistemic modesty is congenial to methodological naturalists who explain applicability by cognitive and institutional selection (Kuhnian paradigms and Popperian trial and error are relevant to the historical dynamics)¹⁰⁶, and to anti-realists such as van Fraassen who emphasise empirical adequacy over metaphysical commitment¹⁰⁷.

Second, distinguish levels of structure. Some structures are coarse and robust — the persistence of conservation laws or symmetries — and therefore lend themselves to multiple distinct formal representations. Other structures are fragile or context-dependent and resist global formalisation. This distinction helps explain why some mathematical tools (for example, linear algebra in classical mechanics, Fourier analysis in heat and signal phenomena) appear repeatedly: they target robust relations that are widely instantiated. Philosophers of science who defend structural realism make related points about the continuity of structure between theory change and empirical success¹⁰⁸; readability can be read as a programme that explains that continuity without insisting on a single metaphysical commitment.

Third, incorporate a theory of information and signification. If readability involves isolating patterns, then accounts of information and signals are germane. Shannon's mathematical theory characterises information in terms of distinguishable states and transmission¹⁰⁹, while contemporary philosophy of information situates information as a bridge between syntax and semantics¹¹⁰; Dretske's work makes

¹⁰⁶Kuhn, *Structure of Scientific Revolutions*, 43–52. Popper, *Logic of Scientific Discovery*, 57–73.

¹⁰⁷van Fraassen, *Scientific Image*, 12.

¹⁰⁸Ladyman and Ross, *Every Thing Must Go*, 66–129. Popper, *Logic of Scientific Discovery*, 57–73.

¹⁰⁹Shannon, "Mathematical Theory of Communication."

¹¹⁰Shannon, "Mathematical Theory of Communication."

explicit the inference from information-bearing states to knowledge claims ¹¹¹. Semiotic resources — Peirce's triadic sign, Eco's interpretive layers — illuminate how a pattern becomes a readable sign, not merely a correlate ¹¹². These perspectives help resist a purely anthropocentric scepticism: the fact that a pattern functions as an informative token is not exhausted by human interests but depends on stable correlations exploitable by interpreters in varied modalities.

A theological layer is compatible with this pluralist framing. The Qur'ānic discourse of āyāt (signs) can be read as an injunction to attend to regularities in the created order that disclose intelligibility while remaining distinct from the divine source ¹¹³. Classical Islamic thinkers debated the scope of rational demonstration and the role of revelation — from Al-Ghazālī's sceptical critiques to Ibn Rushd's defence of rational theology — while later commentators such as Nasr, Izutsu and Al-Attas situated the Qur'ānic hermeneutic within broader cosmological and metaphysical claims about meaning and symbolism ¹¹⁴. Readability provides a conceptual bridge: it treats āyāt as instances where the world is structured so as to be read — by empirical minds, mathematical formalisms, or by theological reflection — without collapsing the distinctions among those modes.

Objections press from both directions. A sceptic may argue that readability is merely anthropocentric: we read only those regularities our methods allow. A metaphysical realist may counter that this reduces structure to projection. Readability answers by being explicitly pluralist and procedural: it acknowledges anthropogenic selection and cognitive constraints while insisting that the success of representation must itself be explained through the existence of stable correlations that agents exploit. It thereby avoids the metaphysical extravagance of claiming that science proves theology, while also refusing the anti-realist reduction of successful formalisation to mere bookkeeping.

Pulling the argument together, readability reframes the puzzle of mathematical applicability as an epistemic phenomenon: mathematics is a refined instrument for isolating and manipulating stable relational patterns in the world, thereby enabling novel empirical tests. This account honours the methodological lessons of Kuhn, Popper and Quine about theory choice and revision ¹¹⁵, is consonant with information-theoretic and semiotic analyses ¹¹⁶, accommodates structural realist insights about continuity of structure ¹¹⁷, and offers a language in which Qur'ānic notions of āyāt can be integrated without collapsing scientific and theological modes of explanation. Readability neither dissolves metaphysical questions nor converts scientific success into theological proof; rather, it clarifies how

¹¹¹Dretske, *Knowledge and the Flow of Information*, 44–46.

¹¹²Eco, *Theory of Semiotics*. Eco, *Theory of Semiotics*.

¹¹³Qur'ān 3:190–191; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹¹⁴Qur'ān 2:164; 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹¹⁵Kuhn, *Structure of Scientific Revolutions*, 43–52. Popper, *Logic of Scientific Discovery*, 57–73. Quine, *Word and Object*, 23–72.

¹¹⁶Qur'ān 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹¹⁷Popper, *Logic of Scientific Discovery*, 57–73. Quine, *Word and Object*, 23–72.

different intellectual traditions legitimately converge upon the fact that reality, in many respects, is written so that it can be read.

Chapter 9 — Representation, Prediction, and Corrigibility

A representation—whether a scientific theory, a map, or a credo—reads reality only to the extent that reality can correct it. This claim is not an empirical assertion about specific doctrines but a methodological one: the epistemic content of any representation is proportional to the ways in which its propositional structure is open to refutation, amendment, or refinement by states of affairs external to it. The idea resonates with Popper’s emphasis on the primacy of severe tests and falsifiability in discriminating empirical content from mere accommodation ¹¹⁸. Prediction, in particular, furnishes a demanding form of such a test because it extends a representational structure beyond immediately available data and thereby renders it vulnerable to novel counterinstances. One novel, robustly confirmed prediction does not constitute incontrovertible proof; nevertheless, the repeated, independent success of predictive frameworks imposes a cumulative philosophical pressure to account for why those frameworks continue to comport with the world.

It is useful to introduce two conceptual distinctions at the outset. First, between accommodation and prediction: accommodating past or local data is a weaker indicator of representational fidelity than generating novel, risky consequences that were not built into the system by fiat. Second, between corrigibility and ideological closure: corrigibility denotes systemic openness to revision in light of recalcitrant phenomena; ideological closure denotes procedures that immunize a system against such revision. A worldview that reorganises experience to evade disconfirming evidence may have high internal coherence but low external readability. In historically salient cases—Ptolemaic epicycles vs. the Copernican system, or Newtonian mechanics confronted by the perihelion precession of Mercury and ultimately subsumed within Einstein’s relativity—prediction and anomaly played demonstrably different roles in testing the relative readability of competing frameworks (cf. Kuhn on paradigms and anomalies) ¹¹⁹.

Philosophical objections must be acknowledged. The underdetermination thesis—famously elaborated by Quine—reminds us that multiple, empirically equivalent theories can be compatible with the same body of evidence ¹²⁰. Van Fraassen’s constructive empiricism presses an anti-realist lesson: empirical adequacy, not metaphysical truth, is the proper aim of science ¹²¹. These positions temper any naïve inference from predictive success to metaphysical realism. The right response is not to deny underdetermination or the anti-realist caution, but to recognise a graded epistemic economy: predictive success does not mechanically prove truth, yet it increases the rational pressure for realist accounts or other explanations of why the models work so well—an explanatory demand that has motivated philosophers from Wigner to Putnam in reflecting on the uncanny effectiveness of

¹¹⁸Popper, *Logic of Scientific Discovery*, 57–73.

¹¹⁹Kuhn, *Structure of Scientific Revolutions*, 43–52.

¹²⁰Quine, *Word and Object*, 23–72.

¹²¹van Fraassen, *Scientific Image*, 12.

mathematics and the fit between theory and the world ¹²². The burden, in other words, shifts from categorical verification to comparative explanation.

To render 'readability' conceptually robust, it is helpful to stage information-theoretic and semiotic resources alongside epistemology. Shannon's formalisation of information identifies channels, noise, and the capacity to transmit signals as central concerns ¹²³; Floridi and Dretske extend this to semantic notions of information insofar as states of the world causally bear content relevant to receivers ¹²⁴. Semiotics—Peirce's triadic sign relation and Eco's reflections on open texts—remind us that interpretation involves an interpretant who may proliferate readings, some corrigible, some hermetic ¹²⁵. Conjoining these insights, a readable reality is not merely a landscape of raw data but a field of āyāt—signs—that invite interpretation, impose constraints on interpreters, and thereby allow for correction.

This synthesis bears directly on theological claims about scriptural āyāt. Islamic scholarship has long treated āyāt as polyvalent signs—natural and textual—that solicit reflective interpretation, not hermetic finality (cf. Izutsu and Rahman for the Qur'ānic semantic texture and major themes) ¹²⁶. The methodological implication is modest and principled: if one reads scripture as reporting facts about the world, that reading acquires epistemic standing only insofar as it is open to revision when confronted with recalcitrant data; conversely, if scriptural claims are read as primarily ethical or existential, their standards of correction differ. Al-Attas and other thinkers emphasise a metaphysical grammar in which signs point beyond themselves without thereby eliminating interpretive responsibility ¹²⁷. Crucially, none of this entails that empirical science can prove or disprove theological truth-claims; rather, the wager is methodological coherence: theological interpretation that embraces corrigibility is epistemically stronger than dogmatic closure because it renders its assertions accountable to a broader ecology of reasons.

A final objection worth confronting is circularity: might the demand for corrigibility simply privilege naturalistic attitudes in advance? This is a legitimate worry. The less question-begging posture is pluralist and charitable: naturalists, realists, anti-realists, and religious interpreters can all accept corrigibility as an epistemic virtue without thereby committing to the same standards of what counts as adequate correction. For naturalists, corrigibility often implies empirical testing and theory revision; for religious traditions, it may mean exegetical renewal, ijtihād, or alignment with ethical and spiritual exigencies. What unites these disparate practices is a common epistemic humility—an

¹²²Wigner, "Unreasonable Effectiveness of Mathematics." Putnam, *Mathematics, Matter and Method*, 60–78.

¹²³Shannon, "Mathematical Theory of Communication."

¹²⁴Floridi, *Philosophy of Information*, 80–107. Dretske, *Knowledge and the Flow of Information*, 44–46.

¹²⁵Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

¹²⁶Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 1–16.

¹²⁷al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

acknowledgement that our representations are fallible and that their credibility increases when they permit substantive correction by realities external to them.

In sum, readability is best understood as an interplay among information-bearing signs, theory-constitutive predictions, and interpretive norms that privilege corrigibility over immunity. Predictive success intensifies the demand for explanation, but it does not deliver metaphysical proof. A responsible hermeneutics of the āyāt, whether pursued within scientific or theological registers, therefore embraces corrigibility: it treats signs as invitations to inquiry rather than as litmus tests that foreclose it. Reality reads us back, and the most epistemically generous stance is to let that reading revise our representations.

Chapter 10 — The Limits of Scientific Readability

Science is unquestionably one of our most powerful methods for rendering the world readable: it isolates patterns, formulates laws, constructs models, and delivers technologies that amplify our sensory and conceptual access. Yet to say that scientific method is an unsurpassed or exclusive vehicle for all forms of understanding is to collapse a plurality of distinct explanatory questions into a single genus. Readability, here, must be teased apart. At least four conceptual registers deserve separate attention: the syntactic register of information-bearing regularities; the semantic register of meaning and intentionality; the normative register of value and reason; and the metaphysical register of grounding and ultimate significance. Each register raises different questions, adopts different standards, and is partly resistant to reduction to methods appropriate to the others.

The syntactic register is the province where science and information theory most obviously excel. Drawing on formal tools, scientists compress data into laws, compute probabilities, and transmit messages with minimal loss—procedures captured abstractly in Shannon’s quantitative account of communication ¹²⁸ and in later philosophy of information ¹²⁹. In this register, readability means reproducible codification: the ability to detect lawful correlations, build predictive models, and communicate them intersubjectively. Wigner’s famous observation about the applicability of mathematics to physics points to the surprising, yet empirically grounded, success of such codification without thereby settling questions that belong to other registers ¹³⁰.

The semantic register foregrounds meaning and intentionality. Human discourse, signs, and mental contents are not exhausted by mere signal patterns: they exhibit aboutness. Philosophers of mind and language differ over whether such intentionality can be fully naturalized. Dretske’s account of information aims to bridge signal and knowledge ¹³¹, while Searle insists on aspects of intentionality and subjectivity that resist straightforward reduction to syntactic manipulation ¹³². The problem of consciousness—its qualitative character and first-person accessibility—is a paradigmatic instance in

¹²⁸Shannon, "Mathematical Theory of Communication."

¹²⁹Shannon, "Mathematical Theory of Communication."

¹³⁰Wigner, "Unreasonable Effectiveness of Mathematics."

¹³¹Dretske, *Knowledge and the Flow of Information*, 44–46.

¹³²John R. Searle, *Intentionality* (Cambridge: Cambridge University Press, 1983), 1.

which syntactic description, however complete, seems to leave something ostensibly irreducible (the “hard problem” in contemporary debates)¹³³. Naturalists may argue that future sciences will accommodate these phenomena, and this remains a live hypothesis; anti-realists and instrumentalists can point to the pragmatic success of treating certain theoretical terms as tools rather than literal descriptions¹³⁴. The philosophical stance one adopts affects whether one treats unreadable seeming as a limit of current method or as an in-principle gulf.

The normative register addresses reasons, values, and logical validity. Questions about what we ought to do, what counts as a reason, and what makes an inference valid are not answered simply by measuring frequencies or causal efficacies. Kant distinguished the autonomous status of practical and theoretical reason; his critique warns against conflating empirical explanation with normative justification¹³⁵. Logical truths and mathematical necessities pose another puzzle: are they discovered features of a world that permits inquiry, or are they human constructions that facilitate it? Debates from Quine’s holism to Putnam’s reflections on mathematics and matter illustrate the range of positions one might take without forcing agreement on a single epistemic protocol¹³⁶.

Finally, the metaphysical register concerns the ultimate intelligibility of the world—that there is any world orderly enough to be read at all. This is not a gap-of-science argument claiming the authority of revealed dogma; it is an existential-philosophical question: why does systematic inquiry of any kind succeed, even incrementally? Philosophers have offered different responses: scientific realists point to the convergence and predictive reach of theories as evidence of a mind-independent order¹³⁷; critics of reductionism highlight the theory-ladenness of observation and the role of paradigms in shaping what counts as readable¹³⁸. From an Islamic philosophical perspective, the Qur’ānic notion of āyāt—signs manifest in the cosmos, history, and scripture—frames readability as layered and theologically saturated, an invitation to interpret rather than a mere catalogue of facts¹³⁹. Classical Islamic thinkers elaborated this by integrating metaphysical commitments with epistemic practices, arguing that signs operate at multiple levels of depth and intention¹⁴⁰.

Several objections merit consideration. One might claim that acknowledging plural registers amounts to an abdication: either all ought to be reduced to science, or else we concede epistemic relativism. This is avoidable. Recognizing plurality need not sanction incoherence; it simply insists that different questions require different methodologies and standards. A second objection is that the distinction is historically contingent—future science may assimilate minds, values, and meaning into naturalistic

¹³³Chalmers, *Conscious Mind*.

¹³⁴Chalmers, *Conscious Mind*.

¹³⁵Kant, *Critique of Pure Reason*.

¹³⁶Quine, *Word and Object*, 23–72. Putnam, *Mathematics, Matter and Method*, 60–78.

¹³⁷Boyd, “Current Status of Scientific Realism,” 41–82.

¹³⁸Qur’ān 2:164; 12:111; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹³⁹Qur’ān 2:164; 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹⁴⁰Rahman, *Major Themes of the Qur'an*, 65–79.

explanation. That possibility should be taken seriously; but conceiving of readability as the property that different practices seek to disclose preserves the question of why such practices work at all even if their contents shift.

A concrete example helps: consider the statistical mechanics of a gas (syntactic success), the interpretation of a poem about the same gas as symbolizing freedom (semantic and normative readings), and the metaphysical question whether the gas's being is grounded in some providential order or brute contingency. Scientific description can illuminate the first; hermeneutic and ethical inquiry address the second; metaphysical reflection frames the third. To insist that the first exhausts all legitimate inquiry is to impoverish the notion of readability.

To draw the strands together, the world is readable in more than one way. Science furnishes indispensable tools for decoding patterns and predicting phenomena, but it does not automatically resolve questions of meaning, normativity, or ultimate ground. Attending to the plurality of registers—while remaining open to the genuine expansions of scientific understanding—cultivates intellectual humility and pluralism. The Qur'ānic category of *āyāt*, read alongside contemporary and classical philosophy, can be understood not as supplanting scientific inquiry but as reminding us that signs admit of multiple, sometimes overlapping, modes of reading; the task of a reflective epistemology is to clarify those modes, their limits, and the ways they mutually inform one another.

Part IV — The Reader

This part develops the monograph's central question by moving from the phenomenon of knowability to its conceptual, scientific, semantic, Qur'ānic, and metaphysical interpretation. The chapters are cumulative: each preserves the distinctions established earlier while testing them against a new domain.

Chapter 11 — Cognition and Epistemic Access

Knowing the world is not a matter of standing apart and surveying an unmediated tableau; it is an activity embedded in bodies, instruments, languages, institutions, and histories. This chapter advances a modest but consequential thesis: reality is readable — that is, it reliably issues traces that can be picked up, interpreted, corrected, and accumulated — precisely because knowing is embodied, instrumentally mediated, socially corrected, and historically situated. At the same time, the thesis insists that mediation need not be imprisonment. Instruments, conventions, and procedures extend rather than replace causal contact with the world; public methods expose private error; and language and material inscriptions permit cumulative memory. The capacity for mediation to improve is itself a feature of readability.

To clarify what is at stake it helps to make a few distinctions. First, take embodiment. Cognitive processes are not ghostly, contextless computations; they are ensconced in sensorimotor systems that shape what is accessible and how it is attended to. This point is emphasized in contemporary work on extended and embodied cognition: cognitive systems amplify their reach by coupling with tools and

artifacts that change the causal profile of interaction with the environment ¹⁴¹. Thus a bat's echolocation, a microscope's resolving power, a mathematical model's idealisations, and an unaided human perceptual system are each different modes of access to reality. They do not share a single neutral vantage; they provide distinct readings of overlapping aspects of the world.

Second, distinguish causal-readability from representational or semantic-readability. A thermometer furnishes causal information about ambient temperature without thereby possessing propositional contents in the human sense. Dretske's account of information flow helps make this point: signals can carry information because of lawful correlations between states, not because they instantiate the same concepts as the interpreter ¹⁴². Semiotic treatments — from Peirce's triadic sign to Eco's cultural semiotics — further remind us that interpretation involves conventions and inferential practices that cannot be collapsed into raw causation ¹⁴³. Between these layers sits mathematical representation: the uncanny efficacy of mathematics in describing nature underscores that some readings are especially productive even when they are highly abstract ¹⁴⁴.

Third, the social and historical dimensions matter for reliability. Methods for error correction are not merely local habits; they are institutionalised procedures—peer review, replication, experimental controls—that enable observers to test, criticize, and revise interpretations. The epistemic benefits of such public methods have been argued from Popper's emphasis on falsifiability to Kuhn's account of disciplinary norms and revolutions; both stress that what counts as a good reading is socially mediated and historically contingent ¹⁴⁵. Quine's holism likewise warns that our statements about the world are networked and revisable ¹⁴⁶. These insights generate a healthy epistemic modesty but do not entail that no stable reading is possible.

Objections may be raised from radical anti-realist or constructivist quarters: if every reading is theory-laden and situated, how can we speak of reality as readable rather than merely constructed? Here the notion of progressive reliability is crucial. Readability need not mean immediate, infallible, or complete transparency. It denotes instead that, given causal coupling, instrument-extension, and socially corrected practices, different cognitive systems can converge on stable and predictively successful interpretations. Realists point to the continuity between successful intervention and truth-likeness; van Fraassen and other anti-realists resist ontological commitments beyond empirical adequacy and predictive success ¹⁴⁷. A balanced account recognises both the achievement of convergence (what Boyd calls the pragmatic warrant of scientific realism) and the limits of metaphysical certainties ¹⁴⁸.

¹⁴¹Clark, *Supersizing the Mind*, 1–82.

¹⁴²Dretske, *Knowledge and the Flow of Information*, 44–46.

¹⁴³Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

¹⁴⁴Ladyman and Ross, *Everything Must Go*, 66–129.

¹⁴⁵Popper, *Logic of Scientific Discovery*, 57–73. Kuhn, *Structure of Scientific Revolutions*, 92–110.

¹⁴⁶Quine, *Word and Object*, 23–72.

¹⁴⁷van Fraassen, *Scientific Image*, 12. Eco, *Theory of Semiotics*.

¹⁴⁸Boyd, "Current Status of Scientific Realism," 41–82.

The pluralism of readers also carries ethical and hermeneutical implications. The Qur’ānic idiom of *āyāt* — often translated as “signs” — accommodates a layered notion of readability: the cosmos and scripture alike present indications that invite different kinds of engagement, from perceptual noticing to moral reflection and theoretical modelling ¹⁴⁹. Classical Islamic thinkers wrestled with similar tensions between appearance and reality, method and meaning; al-Ghazālī’s sceptical probing and Ibn Rushd’s defence of rational inquiry are both part of that conversation about how signs should be read and corrected ¹⁵⁰. al-Attas’s metaphysical reflections further show how ontology and epistemology interrelate in Islamic thought without collapsing science into theology ¹⁵¹.

Concrete examples help make the abstract live. A microbiologist reading a slide with a microscope accesses organisms and structures that are invisible to unaided vision; the microscope does not conjure life but extends causal contact and supports intersubjective validation through repeatable preparation and imaging. A mathematician’s model of planetary motion abstracts away friction, composition, and irregularities, yet its predictive reach — and its subsequent correction when deviant phenomena appear — illustrates how idealisation can be epistemically productive without claiming ontological transparency ¹⁵². A bat’s sonar reveals a landscape of echoes that is real for the bat but incompletely overlaps with the visual reading available to humans; acknowledging these differences undercuts anthropocentrism while affirming that multiple readings converge on genuine patterns.

Weighing these considerations together, readability is a graded, plural capacity grounded in causal coupling, extended by instruments and representations, disciplined by public methods, and enriched by historical memory. It neither presumes immediate, infallible access nor succumbs to total sceptical relativism. For naturalists and realists, it explains the success and corrigibility of empirical inquiry; for anti-realists, it preserves the centrality of empirical adequacy and method; for Islamic hermeneutics, it resonates with the Qur’ānic idea of *āyāt* as invitations to varied but accountable reading. The upshot is epistemic humility combined with methodological ambition: reality is readable enough to learn from, and our task is to refine the practices by which its signs are noticed, tested, and interpreted.

Chapter 12 — Consciousness, Intentionality, and Meaning

A mere covariation between a physical state and an external condition does not by itself constitute a conscious thought about that condition. That basic observation points to a central philosophical problem: how does a system move from being causally correlated with environmental regularities to possessing representations that are genuinely about the world? To treat this question productively it is helpful to separate three distinct levels of description that are often conflated.

First, there is the level of signal and correlation: systems can carry, transmit, and transform information in the technical sense of channel capacity, entropy, and noise management without any semantic

¹⁴⁹Qur’ān 2:164; 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹⁵⁰al-Ghazālī, *Incoherence of the Philosophers*, 166–167. Ibn Rushd, *Decisive Treatise*, 1–9.

¹⁵¹al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

¹⁵²Clark, *Supersizing the Mind*, 1–82.

commitment. Claude Shannon's formalism captures how a transmitter and receiver can share patterns reliably even when neither token bears meaning in the intentional sense ¹⁵³. Second, there is informational content construed as semantic or representational content: here theorists ask when a physical state picks out an external referent, admits truth and falsehood, and supports inferences. Naturalistic attempts to account for this move include causal-informational theories (which appeal to reliable covariance), teleosemantic accounts (which appeal to evolutionary function), and inferential or functional accounts (which appeal to a role within cognitive economies). Dretske's information-theoretic semantics and Floridi's broader philosophy of information exemplify efforts to bridge signal and meaning while honouring the resources of empirical science ¹⁵⁴. Third, there is the reflective, normative level of consciousness: when a system can ask "Am I wrong?" or entertain that its states may be mistaken, representations become objects of evaluation, not merely carriers of regularities. This reflective capacity is where questions of justification, truth, and rational assessment enter.

Concrete contrasts help to sharpen these levels. A thermostat and a scientist both covary with ambient temperature, but only the scientist typically inhabits a normative space of error: she can doubt, test, revise, and communicate reasons. A phototactic bacterium and a person seeing red both respond to light, but only the latter involves higher-order states that can be evaluated as veridical or illusory. The emergence of such epistemic normativity is not explained merely by increased complexity of signal-processing; it supposes structural features — error-detection mechanisms, inferential capacities, and, crucially, forms of social and linguistic practice — that confer the possibility of truth-aptness.

Naturalists have supplied multiple strategies for demarcating this transition. Functionalists and computationalists argue that appropriate systemic roles — input/output relations, systematicity, and the ability to participate in inference — suffice for content and normativity ¹⁵⁵. Teleosemanticists locate content in evolutionary functions that make certain states reliable indicators of distal conditions ¹⁵⁶. Critics press that these accounts may import explanatory gaps: how does a causal history or functional role yield normative rights and wrongs? Searle's critique emphasizes the categorical difference between causal processes and intentionality, while Dennett's "intentional stance" suggests a pragmatic route: attributing beliefs and desires is a useful interpretive strategy for predicting behaviour ¹⁵⁷. Each move invites objections: proponents of scientific realism may insist that representational content must be constrained by mind-independent features of the world to secure truth ¹⁵⁸, whereas constructive empiricists warn that success need not imply literal referents beyond observables ¹⁵⁹.

¹⁵³Shannon, "Mathematical Theory of Communication."

¹⁵⁴Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

¹⁵⁵Dretske, *Knowledge and the Flow of Information*, 44–46. Peirce, *Philosophical Writings*, 99.

¹⁵⁶Searle, *Intentionality*, 1.

¹⁵⁷Searle, *Intentionality*, 1. Dennett, *Darwin's Dangerous Idea*.

¹⁵⁸Peirce, *Philosophical Writings*, 99.

¹⁵⁹Peirce, *Philosophical Writings*, 99.

Philosophical resources offer further discriminating tools. Peircean semiotics insists on a triadic relation — sign, object, interpretant — thereby embedding interpretation and normativity within the very notion of a sign ¹⁶⁰. Kant's epistemology reminds us that conditions internal to cognition (the categories) contribute to the form of experience and so to what counts as representation at all ¹⁶¹. Historical episodes in the philosophy of science, from Kuhn's paradigms to Popper's methodological falsificationism, show that the criteria for treating a state as a candidate for truth are shaped by communal standards, practices, and critical tests, not merely by non-normative covariations ¹⁶².

An Islamic perspective brings a complementary dimension. The Qur'ān speaks of āyāt — signs — in both scripture and the created order, and classical Muslim thinkers read āyāt as invitations to interpretation rather than brute givens ¹⁶³. For thinkers such as al-Ghazālī and Ibn Rushd, the question of how humans discern and interpret signs intersects theology and epistemology: divine authorship of scripture and the intelligibility of nature together create a framework in which interpretive responsibility and humility are paramount ¹⁶⁴. Contemporary Muslim philosophers have emphasised that understanding āyāt involves both cognitive attunement to regularities and an ethical-linguistic practice of meaning-making that acknowledges transcendence without collapsing into mere fideism ¹⁶⁵. This stance neither conflates signs with propositional knowledge nor denies the scientific study of information; it insists that “readability” is a dialectic between world and agent, one that embeds normativity and purpose.

All told, the transition from causal correlation to intentional representation demands more than covariance: it requires structural features that permit error-sensitivity, inferential embedding, and participation in communal epistemic norms. Naturalist accounts propose plausible mechanisms — functional roles, evolutionary histories, computational architectures — but must still explicate how normative status is conferred rather than projected. Anti-realist perspectives rightly remind us that pragmatic and methodological commitments play a constitutive role in what we call representation. The Qur'ānic notion of āyāt provides a philosophically fruitful lens: it foregrounds the idea that the world is, in part, readable — that signs solicit interpretation, judgment, and ethical response — thus situating the emergence of intentionality within a broader metaphysical and hermeneutic economy ¹⁶⁶. Any adequate account will need to marry the explanatory resources of information theory and cognitive science with careful attention to the normative, social, and, where invoked, theological significances that render a pattern intelligible as a bearer of truth.

¹⁶⁰Peirce, *Philosophical Writings*, 99.

¹⁶¹Kant, *Critique of Pure Reason*.

¹⁶²Kuhn, *Structure of Scientific Revolutions*, 43–52. Popper, *Logic of Scientific Discovery*, 57–73.

¹⁶³Qur'ān 2:164; 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹⁶⁴al-Ghazālī, *Incoherence of the Philosophers*, 166–167. Ibn Rushd, *Decisive Treatise*, 1–9.

¹⁶⁵Qur'ān 3:190–191; 39:18, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹⁶⁶Qur'ān 3:190–191; 39:18; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

Chapter 13 — Evolution and Mind–World Fit

Evolutionary theory supplies a powerful and parsimonious account of why many cognitive capacities are reliable in the contexts in which they evolved. Natural selection tends to favour organisms that discriminate between environmental states relevant to survival and reproduction: those that correctly detect a predator, locate food, or choose a mate will on average leave more descendants than those that do not. Describing this process requires nothing mystical; it is precisely the kind of causal account that Darwinian and neo-Darwinian frameworks provide and that philosophers of biology and mind have integrated into broader theories of cognition ¹⁶⁷. More technically, organisms come to encode and transmit information about certain regularities in their environments, and information-theoretic treatments can model how such encoding improves fitness-relevant decision-making ¹⁶⁸. That much is widely conceded across methodological camps.

But this explanatory success does not by itself dissolve a residual, philosophically urgent question: what is the scope of the fit between evolved cognition and truth, particularly in domains remote from the selective pressures of ancestral environments? It is one thing to explain accurate colour discrimination or predator detection; it is another to explain human successes in abstract domains such as mathematics, cosmology, or theoretical physics—domains whose subject-matter was simply not present as adaptive problems in palaeolithic niches. Why are cognitive capacities shaped by selection nevertheless able to generate and recognise truths or reliable theories about entities and relations that were never encountered as fitness-relevant? This is the core problem this chapter isolates.

To sharpen the issue it helps to distinguish three related notions often conflated. First, reliability in an evolutionary sense: a disposition that yields behaviour leading to increased fitness in relevant environments. Second, representational accuracy or truth-tracking: the extent to which cognitive states correspond to worldly facts across contexts, including non-ecological ones. Third, informational exploitability: the capacity to use patterns in inputs to generate novel inferences or models, regardless of whether those models correspond to mind-independent structures. Dretske and Floridi provide useful resources for thinking about information and its flow in biological systems without presupposing metaphysical commitments about truth ¹⁶⁹. But recognising these conceptual distinctions also reveals a gap: evolutionary reliability need not guarantee truth-tracking beyond ecological domains.

Several responses are available. A naturalist or compatibilist can argue that there is continuity between ecological intelligence and abstract reason: cognitive mechanisms that evolved for pattern detection and causal inference can be exapted and scaffolded by cultural and formal practices (language, mathematics, experimental method) to produce genuine insights into remote domains. Dennett's

¹⁶⁷Nagel, *Mind and Cosmos*.

¹⁶⁸Dretske, *Knowledge and the Flow of Information*, 44–46. Dennett, *Darwin's Dangerous Idea*. Clark, *Supersizing the Mind*, 1–82.

¹⁶⁹Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

evolutionary perspective on mind stresses such continuity and the role of cultural evolution in amplifying and redirecting biological capacities ¹⁷⁰. Quine's remarks about the web of belief likewise suggest that far-reaching theoretical claims can be accommodated through revisions that preserve overall predictiveness and coherence ¹⁷¹. From the anti-realist or constructive empiricist side, one might insist (following van Fraassen) that what matters is empirical adequacy, not metaphysical correspondence; the success of a theory is a measure of its purchase on observables, not a proof of access to a transcendent realm of mathematical objects ¹⁷².

Scientific realists press back by invoking the "no miracle" intuition: the predictive and technological success of scientific theories is best explained by the claim that these theories are at least approximately true or that they latch onto the structure of an independent reality ¹⁷³. The puzzle sharpens further when one considers the remarkable applicability of mathematics in physics—Wigner's famous observation that mathematics seems unreasonably effective in describing natural phenomena ¹⁷⁴. Putnam and others have explored whether such fit demands a metaphysical account of mathematical entities or whether structural and pragmatic explanations suffice ¹⁷⁵. These debates show that the residual question identified above is not merely an empirical lacuna but a crossroads where metaphysical, epistemological, and methodological commitments diverge.

From an Islamic philosophical perspective, the Qur'ānic notion of āyāt (signs) offers a framing that is neither straightforwardly scientific nor reductively metaphysical. The Qur'ān speaks of natural phenomena as āyāt—readable signs that invite reflection and point beyond themselves ¹⁷⁶; classical and modern interpreters (e.g., Izutsu, Rahman, al-Attas, Nasr) elaborate how these signs can be both empirical and metaphysical, integrating observation with meaning without collapsing one into the other ¹⁷⁷. Semiotic resources (Peirce, Eco) help here: āyāt function as indices and symbols whose interpretability depends on both worldly regularities and a community of interpreters who bring conceptual tools to bear ¹⁷⁸. This view can accommodate the evolutionary account of perceptual ingenuity while also insisting that the human capacity to read āyāt involves purposive orientation toward meaning, not merely fitness-driven information processing.

Objections to invoking metaphysics are worth taking seriously. One worries that appeal to God or Platonic realms to explain the scope of cognitive fit risks explaining too much or slipping into non-falsifiable territory. Others worry that naturalistic accounts underplay the normative dimension of

¹⁷⁰Dennett, *Darwin's Dangerous Idea*.

¹⁷¹Quine, *Word and Object*, 23–72.

¹⁷²van Fraassen, *Scientific Image*, 15–19.

¹⁷³Wigner, "Unreasonable Effectiveness of Mathematics."

¹⁷⁴Wigner, "Unreasonable Effectiveness of Mathematics."

¹⁷⁵Putnam, *Mathematics, Matter and Method*, 60–78.

¹⁷⁶Qur'ān 2:164; 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹⁷⁷Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 1–16. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16. Nasr, *Islamic Cosmological Doctrines*.

¹⁷⁸Qur'ān 41:53; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

truth and meaning. A constructive synthesis recognises both pressures: evolutionary and information-theoretic accounts explain how reliable capacities arise and are extended; philosophical and theological accounts interrogate the metaphysical and normative ground of why the world is in any sense “readable” at all.

In conclusion, evolution provides a necessary but not a sufficient answer to why our cognitive faculties are reliable across both ecological and abstract domains. The continuity from adaptive pattern recognition to abstract theorising offers a promising naturalistic route, but the surprising successes of mathematics and deep theory retain a philosophical pull that invites further reflection. The Qur’ānic concept of *āyāt* suggests a complementary perspective: reality presents itself as interpretable signs, and human cognition—shaped both by biological history and cultural practices—is summoned to read them. Far from resolving the metaphysical question, this pluralised account reframes it: instead of demanding a single final explanation, it recommends an interdisciplinary inquiry—between evolutionary biology, information theory, philosophy of science, and theology—into how organisms come to find reality readable.

Chapter 14 — Artificial Intelligence and Non-Human Reading

Any account of the “readability of reality” must begin by disentangling several distinct capacities that the metaphor of reading collapses. At the most basic level there is detection: the registration of regularities or correlations in sensory or data streams. Next comes representation: the construction of stable symbols, models or maps that encode those regularities. A further step is inference: using representations to predict, control, or explain phenomena. Beyond these are corrective mechanisms—procedures that revise representations in light of error—and, finally, forms of understanding and ascription of significance, which implicate semantic content, purposive grasp, and value. Making these distinctions matters because different philosophical traditions and technical disciplines will locate “reading” at different levels of this hierarchy. The question whether machines can read, whether nature is readable, or whether *āyāt* (signs) in the Qur’ānic sense are discernible will be answered very differently depending on which level one has in mind.

Consider simple illustrative cases. A thermostat detects temperature and triggers valves; an image classifier registers pixel patterns and maps them to categories; a predictive model uses representations to forecast market movements or molecular structures; a scientist revises a theory when anomalous data arise. These vignette-like examples show that systems—natural or artificial—can participate in detection, representation, inference and correction without any commitment to their possessing conscious understanding. The engineering of such capacities is explicable in terms of information flows and transformations, a framework that begins with Shannon’s formal account of information and is elaborated in recent philosophical work on the ontology and epistemology of information ¹⁷⁹.

¹⁷⁹Floridi, *Philosophy of Information*, 80–107. Dretske, *Knowledge and the Flow of Information*, 44–46. Kant, *Critique of Pure Reason*.

From this perspective, “reading” can be modelled as the functional extraction and deployment of stable patterns for prediction and control.

But not all notions of reading are functional. A stronger conception ties reading to intrinsic intentionality or conscious understanding: a grasp of meaning that is not reducible to input–output mappings. On this point philosophers are divided. Searle famously argues that syntax alone cannot yield semantic content—the system might manipulate symbols without understanding¹⁸⁰. Others attempt to naturalise mind by showing how intentionality can emerge from complex systems (cf. Dennett, Clark)¹⁸¹, while dual-aspect or non-reductive accounts insist on an explanatory gap that functional accounts do not bridge (Chalmers)¹⁸². These competing positions shape whether one will count a sophisticated algorithm as genuinely “reading” or merely simulating the outward signs of reading.

The pluralism of positions is mirrored in debates over scientific realism and anti-realism. Realists maintain that successful scientific theories track mind-independent structures and that this success is explained by the world’s being, in some sense, readable¹⁸³. Anti-realists, by contrast, emphasise the role of empirical adequacy and the pragmatic or convention-driven aspects of theory choice (van Fraassen), suggesting that what we read into nature is in significant part a projection of our practices and expectations¹⁸⁴. Kuhn’s account of paradigm change and Popper’s critical rationalism further complicate the picture by showing that the standards and aims of “reading” science evolve and are contested¹⁸⁵. A defensible account of readability must therefore remain agnostic about metaphysical commitments while being sensitive to methodological shifts in scientific practice.

For readers working within an Islamic intellectual horizon, the Qur’ānic notion of āyāt supplies additional conceptual resources. Āyāt function as signs that point both to natural phenomena and to moral-spiritual truths; they invite humans to reflect and derive guidance, but they do not do the interpretive work by themselves¹⁸⁶. Classical Islamic thinkers, from Ibn Rushd to al-Ghazālī, debated the scope of rational inquiry and the relation between scriptural signs and natural causality¹⁸⁷. A contemporary philosophical account can assimilate this hermeneutical sensitivity without importing theological conclusions into scientific methodology: the Qur’ānic insistence on signs underscores that being able to register regularity is different from being able to interpret its significance for life, ethics, or theology.

¹⁸⁰Searle, *Intentionality*, 1.

¹⁸¹Dennett, *Darwin's Dangerous Idea*. Clark, *Supersizing the Mind*, 1–82.

¹⁸²Chalmers, *Conscious Mind*.

¹⁸³Boyd, “Current Status of Scientific Realism,” 41–82. Dennett, *Darwin's Dangerous Idea*.

¹⁸⁴van Fraassen, *Scientific Image*, 12.

¹⁸⁵Kuhn, *Structure of Scientific Revolutions*, 43–52. Popper, *Logic of Scientific Discovery*, 57–73.

¹⁸⁶Qur’ān 3:190–191; 2:164; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹⁸⁷Ibn Rushd, *Decisive Treatise*, 1–9. al-Ghazālī, *Incoherence of the Philosophers*, 166–167.

Objections may be raised from several sides. Naturalists may insist that, ultimately, only functional accounts are necessary; anti-realists protest that readability is a function of our conceptual schemes; religious readers may argue that certain forms of significance cannot be captured by information-theoretic or behavioural criteria. Each objection highlights an important constraint. Functional accounts illuminate how reading capacities can be engineered and how nature admits of structural descriptions; anti-realist worries remind us to avoid naïveté about the role of theory-laden observation; religious perspectives insist on the irreducibility of value-laden interpretation.

These constraints point towards a pragmatic synthesis rather than an eliminative reduction. Readability is usefully analysed as a graded relational property: reality supports patterns that are more or less detectable, representable, inferable, correctable, understandable, and meaningful to particular classes of readers. This multi-level schema permits rigorous investigation of how different systems—biological, cognitive, technological, and theological—participate in the disclosure of reality without prematurely resolving whether any of them possess intrinsic intentionality or whether scientific success entails metaphysical realism. It also honours the Qur’ānic intuition that signs both constrain and invite interpretation: some āyāt are manifest at the level of pattern and law, others require hermeneutic labour to disclose moral and spiritual significance. Methodological humility, coupled with conceptual precision, therefore allows us to study how readable the world is while recognising that “reading” is a family of capacities whose full philosophical status remains disputed.

Part V — Information, Meaning, and Signification

This part develops the monograph’s central question by moving from the phenomenon of knowability to its conceptual, scientific, semantic, Qur’ānic, and metaphysical interpretation. The chapters are cumulative: each preserves the distinctions established earlier while testing them against a new domain.

Chapter 15 — From Difference to Information

Physical reality is full of differences: gradients of temperature, contrasts of colour, particular arrangements of atoms. Yet it is a conceptual mistake to identify information simply with matter. The term information, in its most influential formal guise, abstracts from the substance in which differences are instantiated and instead quantifies the space of distinguishable alternatives under specified conditions—what uncertainty is removed when an outcome occurs. This formal apparatus, developed by Shannon, is deliberately agnostic about meaning: it tells us how much distinction there is between messages, not what those messages are about¹⁸⁸. This distinction between information-as-difference and matter-as-stuff is crucial for thinking about the “readability” of reality.

To sharpen the point it is useful to distinguish three senses of information that are often conflated. First, there is syntactic or statistical information—the Shannon measure—concerned with probability, compression, and channel capacity. Second, there is semantic information, which pertains to content, reference, and truth-conditions; to move from syntax to semantics requires bridging devices that

¹⁸⁸Shannon, "Mathematical Theory of Communication."

assign meanings to patterns. Third, there is pragmatic or agent-centred information: signals that matter to an organism or interpreter because they bear on decisions or action. Philosophers and theorists have modelled these transitions in different ways: Floridi elaborates a general philosophy of information that aims to reconcile formal measures with semantic content, while Dretske explores the conditions under which physical correlations can carry epistemic content ¹⁸⁹. Each of these senses is relevant to how we speak of reality being “readable.”

Readability, therefore, begins where differences become stably registrable. Consider a thermometer: a continuous variation of molecular motion is converted into a needle position or a digital number. That transduction is not yet knowledge; it is a record—a physical inscription that can be compared, preserved, and transmitted. Stability matters because ephemeral fluctuations do not provide a dependable basis for inference. Similarly, DNA sequences are patterns whose reproducibility and recognisability make them readable across laboratories and time. These examples show concretely how physical interactions become records that instantiate syntactic information while remaining open to semantic interpretation.

The crucial philosophical problem is the path from record to knowledge. This path requires at least four kinds of resources. First, reference: a procedure or convention that links a pattern to what it is about (calibrating a thermometer, mapping a DNA codon to an amino acid). Second, background assumptions: theories and models that constrain which interpretations are legitimate. Here the Kantian point about conditions of possibility is salient—there are structural prerequisites for intelligibility that shape what counts as information ¹⁹⁰. Third, calibration and measurement standards that make distinct registries commensurable across contexts. Fourth, inferential norms that govern what counts as legitimate reasoning from data to claims; scientific paradigms articulate these norms and change over time in ways Kuhn described as revolutionary shifts in what counts as an acceptable inference ¹⁹¹. Without these resources, a record is merely a difference without epistemic purchase.

This account invites a spectrum of philosophical responses. A naturalist reductionist might insist that all information ultimately supervenes on and is reducible to material processes; the recogniser is an evolved system and semantics can be explained in causal-functional terms, as some cognitive scientists suggest ¹⁹². An anti-realist or constructive empiricist will emphasise the role of epistemic agents and may deny that reading points to mind-independent semantic content, focusing instead on the empirical adequacy of measurement practices ¹⁹³. Scientific realists will point to the success and coherence of scientific networks of inference as warrant for the existence of robust structures that information tracks ¹⁹⁴. Each stance has resources and limits: realism emphasises continuity between records and an

¹⁸⁹Eco, *Theory of Semiotics*. Dretske, *Knowledge and the Flow of Information*, 44–46.

¹⁹⁰Kant, *Critique of Pure Reason*.

¹⁹¹Kuhn, *Structure of Scientific Revolutions*, 92–110.

¹⁹²Dennett, *Darwin's Dangerous Idea*. Clark, *Supersizing the Mind*, 1–82.

¹⁹³van Fraassen, *Scientific Image*, 12.

¹⁹⁴Eco, *Theory of Semiotics*.

external world, anti-realism stresses the interpretive and theory-laden character of readings, and naturalism offers mechanistic explanations for the emergence of semantic sensitivity.

Religious and textual traditions add a different but compatible perspective. Within the Qur'ānic idiom, āyāt are polyvalent: they are verses of scripture and signs in the world—phenomena that invite reading and moral-theological interpretation. Scholars of the Qur'ān analyse the semantic density of the term āyah and its function as both text and cosmological sign, underscoring an interpretive stance that treats natural regularities as communicative prompts rather than brute data ¹⁹⁵. To read reality as āyāt need not entail a metaphysical claim that science can verify or disprove theology; it is an interpretive posture that layers ethical and existential significance onto the same registers of difference that physicists and biologists study. al-Attas and other Islamic philosophers have elaborated how such readings presuppose a metaphysical framework in which intelligibility itself is a sign of order, but this remains a hermeneutic move compatible with acknowledging the autonomy of empirical methods ¹⁹⁶.

A fair synthesis recognises that readability is a relational property: it arises where stable physical inscription meets interpretive practice. Records constrain interpretation—empirical constraints rule out many readings—but they never determine it uniquely; background theories, semantic conventions, and normative standards shape which readings are adopted. This plural structure explains why diverse intellectual traditions—naturalist, realist, anti-realist, and religious—can all contribute legitimate insights about how the world is read. It also counsels epistemic humility: the capacity to translate difference into knowledge depends on both the affordances of the world and the conceptual lenses we bring to bear. In short, to call reality “readable” is to mark a cooperative achievement between what is given and how we make sense of it, not a simple identity of information with matter nor a licence to conflate scientific description with theological proof.

Chapter 16 — Information Is Not Yet Meaning

A thermometer reading, a sequence of binary digits, and a strand of DNA are all legitimately described in informational terms, but the force of that description differs across levels. Claude Shannon's theory supplies a rigorous measure of syntactic information — the bit count that quantifies uncertainty reduction — yet it is silent about what a string of symbols is about or whether it can be true or false ¹⁹⁷. Semantic content — the aboutness or representational employment of a sign — is a different category. To say that something is informational in the Shannon sense is not to say it carries proposition-like content or that it constitutes a message in the ordinary sense of authored discourse. The central diagnostic I shall use is the possibility of falsehood: only those representations that admit conditions of error, that can legitimately be mistaken about the world, count as possessing semantic content rather than mere causal correlation.

¹⁹⁵Qur'ān 2:164; 41:53; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

¹⁹⁶al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

¹⁹⁷Shannon, "Mathematical Theory of Communication."

Consider three examples. A thermometer, mechanically or electronically, correlates reliably with ambient temperature; it covaries with physical states and so carries measurable signals. If the bulb cracks, the reading will misrepresent — but that misrepresentation is a malfunction within an artefact whose outputs we treat as readable by virtue of an established practice. A written sentence such as “The cat is on the mat” is set within linguistic conventions; it can be true or false relative to the world and the language game in which it is embedded. DNA sequences encode biological instructions insofar as cellular machinery interprets nucleotide triplets to synthesise proteins; biologists routinely speak of genetic “information,” but whether DNA carries propositional content in the way a sentence does is debated. The DNA-to-protein relation is a rule-governed mapping exploited by embodied interpreters (ribosomes), yet it lacks the normative discursive features that characterise belief reports or assertions. These contrasts show why mere causal covariance or formal compressibility does not suffice to establish propositional meaning.

Philosophically, this maps onto a familiar distinction between syntactic, semantic, and pragmatic levels of information. Shannon’s formalism addresses syntax; semantic theories — from Dretske’s account of naturalised information to Floridi’s information ontology — attempt to bridge signal and content by invoking explanatory relations, functions, or inferential roles ¹⁹⁸. Yet even if one accepts a naturalistic account of how systems come to carry representational content (for example, through reliable covariation that organisms exploit), one must still account for intentionality: the directedness of representations to worldly states and the normative space of error and justification ¹⁹⁹. Intentionality cannot be reduced to mere physical coupling without further conceptual work.

Objections press from several directions. A naturalist might argue that once biological or cognitive systems are in play, semantic properties emerge from functional organisation; what begins as causal correlation can acquire truth-conditions by virtue of an organismal economy of signals and responses (a position congenial with Dennett’s and Clark’s accounts of mind and cognition) ²⁰⁰. An anti-realist or constructivist, meanwhile, will insist that semantic attributions depend on interpretative frameworks and pragmatic practices — that meaning is not a property inherent in the world but a feature of our ways of modelling it (a vein of thought resonant with van Fraassen’s emphasis on representational practice) ²⁰¹. Both responses are significant and temper a simplistic move from “information is everywhere” to “the cosmos speaks.”

The move I am here resisting is precisely that shortcut. To infer that the universe not only contains information but actively communicates a message requires supplementary premises: an account of authorship or intentional agency that grounds interpretative norms; an account of a community of interpreters or hermeneutic rules that can read and evaluate putative messages; and an explanation of why certain regularities should be construed as directed signs rather than mere patterns. Semiotic

¹⁹⁸Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

¹⁹⁹Dretske, *Knowledge and the Flow of Information*, 44–46.

²⁰⁰Dennett, *Darwin’s Dangerous Idea*. Clark, *Supersizing the Mind*, 1–82.

²⁰¹van Fraassen, *Scientific Image*, 12.

theory — from Peircean triadic sign relations to Eco’s emphasis on codes and interpretants — reminds us that signhood involves more than correlation; it involves a capacity for being taken up by an interpreter within a system of sign rules ²⁰².

An Islamic theological vocabulary offers one principled alternative for making the additional move. In the Qur’ānic idiom, the world’s regularities are presented as āyāt, signs that invite reflection and moral comprehension, not merely as data to be measured ²⁰³. To construe certain natural phenomena as āyāt is to place them within a divinely authorised hermeneutic: they are addressed, purposive, and meaningful in a way that presupposes intentionality beyond mere physical causation. Classical and modern Muslim thinkers have elaborated this stance in different ways, stressing the epistemic and ethical orientation of reading the cosmos as sign-laden ²⁰⁴. That theological reading is coherent and historically embedded, but it is a metaphysical and interpretative commitment rather than an inferable scientific conclusion; science, properly speaking, diagnoses patterns and relations without adjudicating their ultimate teleology or authorial status.

Considered together, recognising that the universe is replete with structures amenable to informational description is compatible with a plurality of philosophical responses. The conceptual move from ubiquitous information to cosmic message cannot be made on the basis of bit-counting or causal covariance alone; it requires further premises about intentionality, normativity, and hermeneutic practice. Naturalist accounts can show how semantic properties emerge in embodied systems; anti-realist accounts can show how meaning depends upon interpretative frameworks; theological accounts, notably the Qur’ānic notion of āyāt, place those interpretative practices within a theologically informed horizon. Any robust claim that the universe communicates will therefore be philosophical and theological as much as empirical, and it should be articulated with explicit attention to the extra-scientific commitments it presupposes.

Chapter 17 — Representation and Reference

Representation is not a mysterious mirroring of reality but a regulated linking of one state, model, or sign to another reality via practices and relations that make correct and incorrect use possible. This claim draws attention to two interrelated features: first, representations are necessarily selective; second, their success depends on stable relations in the world that render selective tracking dependable. Scientific models, maps, and diagrams exemplify this selectivity. A map omits streets, an ideal-gas law abstracts away molecular detail, and a diagram of the solar system suppresses scale; yet each can be used correctly or incorrectly in ways that presuppose a normative standard of reference. The thesis defended here is that what I will call “readability” — the capacity of finite signs to track salient aspects of a richer reality — is grounded in the conjunction of worldly regularities and

²⁰²Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

²⁰³Qur’ān 2:164; 3:190–191; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²⁰⁴Rahman, *Major Themes of the Qur’an*, 65–79. Nasr, *Islamic Cosmological Doctrines*. The Qur’ān, trans. Abdel Haleem.

communal practices of representation. The philosophical challenge is then to explain how abstractions, by their nature partial, remain answerable to what exceeds them.

To sharpen the argument it helps to distinguish kinds of representation and kinds of sign. Semiotics draws a useful taxonomy: signs may be indexical (causally linked), iconic (resembling), or symbolic (conventional) — distinctions that date back to Peirce and are elaborated in contemporary semiotics²⁰⁵. Scientific models combine these modalities: the thermometer is an index, a phase portrait is iconic, and an algebraic formalism is symbolic. Information-theoretic accounts make another useful distinction between syntactic transmission (Shannon) and semantic or pragmatic content (Floridi, Dretske), thereby clarifying how representations convey not just signals but meaning and actionable knowledge²⁰⁶. Readability concerns not merely that information flows but that it can be interpreted within inferential practices that confer correctness.

Two *prima facie* objections require attention. A naturalist might insist that apparent readability needs no further metaphysical licence: the world is readable because it exhibits regularities that natural selection and cognitive evolution have exploited. A scientific realist will press the stronger claim that successful representation tracks mind-independent structure, while an anti-realist, following van Fraassen, will insist that empirical adequacy, not truth, suffices²⁰⁷. These positions are not trivially reconciled. Kuhn's account of paradigm change reminds us that what counts as a correct use of a representation is historically and disciplinarily mediated²⁰⁸, and Quine's underdetermination suggests multiple, potentially incompatible models can be consistent with the same data²⁰⁹. Yet such pluralism does not negate readability; rather it highlights that answerability takes institutional and methodological forms — experiment, criticism, replication — that temper arbitrariness.

A robust account of how abstraction remains accountable therefore must recognise three elements. First, there are worldly constraints: stable relations and invariances that make selective depiction possible. This is the explanatory space invoked in discussions of the “unreasonable effectiveness” of mathematics and the apparent fit between theoretical structures and natural patterns, a topic that invites philosophical caution rather than metaphysical triumphalism²¹⁰. Second, there are procedural constraints: methodological norms, tests, and corrective mechanisms that allow models to be revised, disconfirmed, or corroborated — the ethos emphasised by Popper as falsifiability and by later philosophers as institutional practice²¹¹. Third, there are interpretative constraints: hermeneutic

²⁰⁵Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

²⁰⁶Shannon, "Mathematical Theory of Communication." Floridi, *Philosophy of Information*, 80–107. Dretske, *Knowledge and the Flow of Information*, 44–46.

²⁰⁷van Fraassen, *Scientific Image*, 12.

²⁰⁸Kuhn, *Structure of Scientific Revolutions*, 43–52.

²⁰⁹Quine, *Word and Object*, 23–72.

²¹⁰Popper, *Logic of Scientific Discovery*, 57–73. Kuhn, *Structure of Scientific Revolutions*, 43–52.

²¹¹Popper, *Logic of Scientific Discovery*, 57–73.

frameworks, background theories, and semiotic competences that govern how signs are read and deployed; here Peircean semiotics and Eco's theory of signification are instructive ²¹².

Concrete examples make this triad vivid. Consider the ideal-gas law: its utility rests on regularities in many macroscopic gases (worldly constraint), is preserved because it can be empirically tested and corrected when inadequate (procedural constraint), and is applied within a vocabulary and inferential toolkit that determine its domain of applicability (interpretative constraint). A Qur'ānic example of readability is the notion of āyah: natural phenomena designated as āyāt are treated as signs that invite reading — causal regularities and moral inference combined — and are addressed through exegetical practices that determine what they signify ²¹³. Islamic thinkers, from classical commentators to modern scholars, have thereby framed a hermeneutic in which empirical observation and ethical-theological reflection are mutually informing ²¹⁴.

The synthesis offered here is modest and pluralist. Readability is a relational property: not a metaphysical licence to infer ultimate truths nor a mere sociolinguistic projection, but a pragmatic affordance grounded in worldly order and sustained by communal interpretative practices. From a naturalist or realist standpoint, this affirms that the world presents patterns we can exploit; from an anti-realist perspective, it recognises the primacy of empirical adequacy and practice; from an Islamic standpoint, it allows āyāt to function as invitations to read both the created order and the ethical obligations of human agency without supposing that scientific success in itself proves theological claims ²¹⁵. Abstraction remains answerable because representational success is continually tested against constraints that are physical, methodological, and hermeneutic. Readability thus mediates epistemic humility and cognitive confidence: it explains why finite signs can guide action and inquiry while reminding us that every reading must be accountable to a reality that, in part, exceeds our representations.

Chapter 18 — When Does Reality Become a Sign?

Not every instance of interpretability should be assimilated to the category of an intended sign. Ordinary deliberations about signs must distinguish at least three modes in which something can function as an indicator. First, there are indexical or causal indicators: a footprint indexes the presence of an animal; smoke indexes fire. Such relations are produced by causal chains and can be exploited by observers without any need to posit an originating intention. Second, there are conventional signs: words, flags, or traffic lights whose semantic content depends upon human agreements and practices. Third, there are intentional communicative signs, produced by an agent with the purpose of conveying

²¹²Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

²¹³Qur'ān 2:164; 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²¹⁴Rahman, *Major Themes of the Qur'an*, 1–16. Nasr, *Islamic Cosmological Doctrines*. The Qur'ān, trans. Abdel Haleem.

²¹⁵Qur'ān 3:190–191; 45:3–5; 51:20–21, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

meaning to recipients. Peirce's taxonomy and later semiotic theory provide useful scaffolding for this disambiguation, distinguishing icons, indices and symbols and thereby clarifying that interpretability is a heterogeneous phenomenon rather than a unitary property ²¹⁶.

This conceptual triage matters for the Qur'ānic claim that aspects of the created order are āyāt—signs pointing to God, to moral lessons, or to metaphysical truths. The fact that natural phenomena are interpretable in indexical or informational terms does not deductively establish that they are intended āyāt. To infer an ontological status of “sign” in the intentional sense—i.e., that the phenomenon was placed or ordered as a communicative token—requires additional philosophical and theological premises. In other words, one must move from “this phenomenon reliably correlates with X” to “this phenomenon was meant to indicate X,” and that transition is not a simple empirical generalisation but a metaphysical and hermeneutical step.

Philosophies of information sharpen the distinction. Shannon's formal theory describes information as a reduction of uncertainty in a channel and is indifferent to semantic or intentional features ²¹⁷. Dretske and Floridi, developing a semantic and ontological account, argue that information in nature can flow and carry content without thereby becoming intentional communication; an indicator can convey information by causal correlation while lacking authorial purpose ²¹⁸. Thus the presence of reliable indexical relations (smoke → fire, tree rings → age) shows informational structure in the world, but does not entail that the world was composed as a text awaiting interpretation.

Naturalist objections often rest on precisely this point: that explanatorily useful patterns in nature—adaptive traits, regularities of physics—are best accounted for by non-teleological mechanisms such as natural selection, emergent self-organisation, or lawful regularities, not by intentional implantation of messages. From the naturalist vantage, to construe such patterns as intentional signs risks anthropomorphism or gratuitous teleology. Conversely, anti-realist epistemologies point out that talk of “signs” frequently depends on the interpretive practices of communities; what one community treats as an āyah another may read as mere indexical regularity. Philosophies of science that emphasise theory-ladenness and underdetermination (from Kuhn's paradigm-dependence to van Fraassen's constructive empiricism) remind us that our interpretive frameworks shape which patterns we call meaningful ²¹⁹.

Realists reply that some interpretive attributions are nevertheless objective: objects have properties that serve as truthmakers for certain propositions, and these can ground claims about meaning or function. Putnam's debates about realism and reference are relevant here—semantic ascriptions, he argues, are constrained by more than subjective stipulation ²²⁰. Theistic and specifically Islamic positions introduce a further dimension: the doctrine that creation bears signs (āyāt) is not merely a

²¹⁶Qur'ān 41:53; 51:20–21, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²¹⁷Shannon, “Mathematical Theory of Communication.”

²¹⁸Floridi, *Philosophy of Information*, 80–107. Eco, *Theory of Semiotics*.

²¹⁹Kuhn, *Structure of Scientific Revolutions*, 43–52. van Fraassen, *Scientific Image*, 12.

²²⁰Putnam, *Mathematics, Matter and Method*, 60–78.

descriptive hypothesis about correlation, but a theological claim about the intentional character of creation. This claim has a long pedigree in Islamic thought; exegetical and philosophical traditions (from classical commentators to modern interpreters) read certain Qur’ānic verses as implying that natural phenomena are offered as signs for reflection and moral orientation ²²¹. Medieval Muslim philosophers debated whether teleology could be read into nature without compromising causal explanations (see the exchanges between al-Ghazālī and Ibn Rushd) ²²². These debates illustrate that commitment to intentionality in nature entails distinct metaphysical premises regarding agency, causation and finality—premises that are not derivable merely from observational data.

Consider some concrete examples to make the distinction vivid. A fossil skeleton is an index of a past organism; it allows us to infer attributes of the organism and the environment. But calling that fossil an āyah, in the Qur’ānic sense, adds an interpretive layer: that the fossil’s existence is meant to prompt ethical or metaphysical reflection. A DNA sequence carries information in the Shannon–Dretske sense, but whether it is a “message” in the communicative, intentional sense is a metaphysical—and for believers, theological—question. The same goes for the regularity of recurring natural cycles: scientifically explicable, yet treated in Qur’ānic discourse as an invitation to gratitude and reflection ²²³.

The upshot is a principled restraint: to move from indexicality or informational reliability to ontological signification requires a justificatory bridge—philosophical arguments about the intentionality of creation, hermeneutic principles for reading texts and nature together, or communal interpretive commitments. Such a bridge may be defended cogently, but it is not a consequence of empirical science alone. Recognising this clarifies both the limits and the strengths of the Qur’ānic claim. It situates āyāt as theological-interpretive attributions that stand in a complementary relation to empirical description: they do not compete with naturalistic explanations but presuppose a distinct set of metaphysical commitments that make the interpretive move intelligible. That is, the claim that nature is readable as āyāt is coherent only within a framework that grants creation an intentional horizon; without endorsing that metaphysical premise one can acknowledge the informational richness of the world while withholding assent to its status as divine sign.

Part VI — The Qur’ānic Horizon of Āyāt

This part develops the monograph’s central question by moving from the phenomenon of knowability to its conceptual, scientific, semantic, Qur’ānic, and metaphysical interpretation. The chapters are cumulative: each preserves the distinctions established earlier while testing them against a new domain.

Chapter 19 — The Semantic World of Āyah

²²¹al-Ghazālī, *Incoherence of the Philosophers*, 166–167. Ibn Rushd, *Decisive Treatise*, 1–9. The Qur’ān, trans. Abdel Haleem. Nasr, *Islamic Cosmological Doctrines*.

²²²al-Ghazālī, *Incoherence of the Philosophers*, 166–167. Ibn Rushd, *Decisive Treatise*, 1–9.

²²³Qur’ān 28:73; 16:12, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

The philosophical account offered above should be anchored, at least schematically, in the text's own compositional history and in the classical exegetical tradition, since a purely conceptual treatment of āyah risks abstraction from the corpus it claims to interpret. Western source-critical scholarship, beginning with Nöldeke's classical periodisation of the sūrahs into three Meccan phases and a Medinan phase, offers one framework for tracing how the vocabulary of āyah shifts across the text's historical unfolding²²⁴. In the Meccan material, āyāt cluster heavily around cosmic and natural phenomena—the alternation of night and day, the fall of rain, the generation of life from what appears lifeless—read as address to an audience not yet institutionally bound to the text, for whom argument from nature functions as a primary mode of persuasion. In the Medinan material, by contrast, āyāt increasingly attach to historical narrative, communal legislation, and the Qur'ān's own self-presentation as revealed discourse, a shift that recent literary-historical scholarship has traced in detail²²⁵. This distribution does not overturn the philosophical analysis offered in this chapter, but it does discipline it: it shows that the polyvalence of āyah described above is not a modern philosophical imposition on the text but a feature already operative in the Qur'ān's own historical development.

Classical tafsīr affords a complementary discipline. Al-Ṭabarī's *Jāmi' al-bayān*, still foundational despite its date, regularly glosses āyah contextually rather than univocally, distinguishing cosmic signs from evidentiary miracles from Qur'ānic verses proper according to the demands of the passage under discussion²²⁶. Ibn Kathīr's tafsīr, working within a more restrictively transmission-based method, likewise treats āyah's reference as determined by context and by ḥadīth-attested occasions of revelation rather than by a single fixed definition²²⁷. Read together, the classical commentators anticipate, in their own idiom, the polyvalence this chapter has argued for philosophically: the same term names cosmic regularity, historical event, and scriptural unit because the Qur'ān treats these as structurally analogous forms of address rather than as accidentally homonymous uses of one Arabic root. Madigan's study of the Qur'an's self-referential vocabulary offers a further caution: the text's own vocabulary for itself is more fluid than a simple partition into natural and scriptural signs suggests, and interpreters should resist forcing the term into categories the text itself does not cleanly observe²²⁸.

The Qur'ānic term āyah (pl. āyāt) resists neat translation into a single English noun. Depending on context it is rendered variously as “sign,” “verse,” “token,” “miracle,” or “indication,” and each translation captures only a facet of a wider semantic field. To treat āyah only as a lexical datum is to

²²⁴Theodor Nöldeke, Friedrich Schwally, Gotthelf Bergsträsser, and Otto Pretzl, *The History of the Qur'ān*, trans. and ed. Wolfgang H. Behn (Leiden: Brill, 2013).

²²⁵Angelika Neuwirth, Nicolai Sinai, and Michael Marx, eds., *The Qur'ān in Context: Historical and Literary Investigations into the Qur'ānic Milieu* (Leiden: Brill, 2011).

²²⁶Abū Ja'far Muhammad ibn Jarīr al-Ṭabarī, *The Commentary on the Qur'ān: Being an Abridged Translation of Jāmi' al-Bayān 'an Ta'wīl Āy al-Qur'ān*, vol. 1, trans. J. Cooper, ed. W. F. Madelung and A. Jones (Oxford: Oxford University Press, 1987).

²²⁷Ibn Kathīr, *Tafsir Ibn Kathir (Abridged)*, 10 vols., trans. and abridged under the supervision of Safi-ur-Rahman al-Mubarakpuri (Riyadh: Darussalam, 2000).

²²⁸Daniel A. Madigan, *The Qur'an's Self-Image: Writing and Authority in Islam's Scripture* (Princeton: Princeton University Press, 2001).

miss how the Qur'ān deploys the term across a range of discursual roles: as a discrete unit of revelation, as an event or object in the world that advertises a truth, and as a spectacular occurrence that invites wonder. Methodologically, then, the interpreter who seeks the concept of āyah in the Qur'ān must attend less to etymology and more to patterns of usage—collocation, syntax, rhetorical function, and the authorial horizon of discourse—together with the Arabic lexical tradition and classical commentarial practice ²²⁹. This hermeneutic point reserves an important place for philology and for the history of interpretation while avoiding anachronistic reductions.

Three conceptual distinctions illuminate the polysemy without erasing it. First, one may distinguish between āyāt as linguistic tokens (the verses of the scripture) and āyāt as natural or historical signs (sunset, embryogenesis, a victory on the battlefield, and so on). The former are grammatical, intentional, and performative; they are embedded within the institutional status of scripture and partake in speech acts—promising, commanding, exhorting—that presuppose deliberative agents and communities (cf. Searle on intentionality and speech acts) ²³⁰. The latter are material or eventful occurrences that, in Qur'ānic discourse, function indexically: they point beyond themselves to an order, a cause, or a purpose. Peircean categories of sign—icon, index, symbol—help us see how a single Arabic lexeme can coherently name both kinds of phenomena while leaving room for ontological difference ²³¹.

Second, it helps to separate the informational from the propositional senses of āyah. Information-theoretic frameworks sharpen this distinction: a natural phenomenon can carry information in the Shannon sense—variation that reduces uncertainty—without thereby guaranteeing semantic content or propositional truth claims ²³². Floridi's and Dretske's work likewise remind us that information flow and semantic meaning are related but distinct phenomena; something can be information-bearing without being an instance of intentional meaning in the strong sense ²³³. Thus when the Qur'ān speaks of signs in creation it need not be making a naïve epistemic claim that every causal regularity is thereby a proposition about God; rather, it asserts that certain phenomena function as readable data that, when interpreted within a moral-theological horizon, instantiate significance.

Third, an analytic distinction between analogical and categorical identity is necessary. The Qur'ānic practice of referring both to revealed verses and to celestial phenomena as āyāt establishes an analogical architecture: the two belong to a family of “readable” items without being identical in kind. This is precisely the sort of analogical thinking found in other philosophical traditions of interpretation (cf. al-Ghazālī and subsequent exegetes ²³⁴), and it is philosophically respectable so long as one resists

²²⁹Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 1–16. al-Tabarī, *Commentary on the Qur'an*.

²³⁰Searle, *Intentionality*, 1.

²³¹Peirce, *Philosophical Writings*, 102.

²³²Shannon, “Mathematical Theory of Communication.”

²³³Floridi, *Philosophy of Information*, 80–107. Dretske, *Knowledge and the Flow of Information*, 44–46.

²³⁴Qur'ān 2:106; 41:37, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

the temptation to conflate ontologies. A verse is not a natural object; a star is not a speech-act. They can, however, participate in a common epistemic economy of signification.

Several objections press on this account. A naturalist may insist that attributing “signhood” to natural phenomena is anthropocentric or merely metaphorical: rocks and stars do not intend to indicate. This objection is accommodated if one adopts an indexical account of natural āyāt—natural events are not intentional but can nonetheless be read as evidential tokens by cognitive agents; the intentionality resides with the interpreter, not with the object. An anti-realist about religious language might contend that āyah-talk licenses no referential claims beyond community practice. That critique is important as a sociological point about meaning-making; it does not, however, negate the Qur’ānic rhetoric that aims to mobilise natural observation for moral and theological ends. Conversely, a theological realist will want to defend a stronger metaphysical claim—that natural āyāt disclose divine authorship. This remains a theological inference and not an empirical deduction from the phenomena themselves; responsible exegesis must therefore distinguish descriptive from theological readings and avoid claiming that empirical science proves metaphysics (a point consonant with the methodological cautions articulated by philosophers of science) ²³⁵.

Concrete examples clarify these moves. The label āyah applied to a Qur’ānic verse marks a linguistic unit with performative force: it enjoins, informs, and shapes communal memory. The label applied to, say, the alternation of night and day, frames that regularity as a readable indicator of order and contingency. The reading of the natural āyāt requires an interpretive act—often theological and moral in orientation—that converts perceptual data into existential or normative insight. Scientific descriptions supply alternative readings: they render the same events as lawful regularities amenable to predictive models. Both readings are intelligible but operate with different vocabularies, standards of evidence, and aims; they can be in dialogue without collapsing into one another.

By way of synthesis, āyah names a polyvalent modality of “readability” that spans language, nature, and history. Recognising the analogical relations among its referents permits a hermeneutics that honours both the textual integrity of scripture and the material integrity of the world. It also imposes methodological discipline: exegetes should not conflate types of sign, naturalists should not reduce all āyah-talk to mere metaphor, and theologians should not convert rhetorical practice into an empirical proof. Seen in this light, the Qur’ānic concept of āyāt provides a robust, plural-respecting framework in which facts, meanings, and values can be held together without category mistake—a framework that invites interdisciplinary conversation rather than terminological annexation ²³⁶.

Chapter 20 — Āyāt in the Qur’ān: A Typology

²³⁵Popper, *Logic of Scientific Discovery*, 57–73. Kuhn, *Structure of Scientific Revolutions*, 43–52. Quine, *Word and Object*, 23–72. van Fraassen, *Scientific Image*, 12.

²³⁶Qur’ān 2:164; 12:111; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

A useful way into the Qur'ānic notion of āyāt is to resist the temptation to collapse the term into a single semantic field. Analytically, it is productive to distinguish at least five overlapping types: revelatory āyāt (scriptural verses and direct communicative acts associated with revelation), creational or cosmic āyāt (features of nature that function as signs), historical āyāt (events in communal memory or narrative that instruct), anthropological āyāt (phenomena within the self—memory, conscience, reason), and extraordinary signs narrated in prophetic accounts. These are not rigid taxonomies imposed on the text but working categories intended to clarify how the Qur'ānic language of “sign” operates across domains. The categories illuminate different modes by which something may be marked as significant without implying a single explanatory mechanism for all instances.

Recognising this plurality matters because each category emphasises different aspects of signhood. Revelatory āyāt are linguistic and intentional: they presuppose a speech act addressed to an audience and read within a discursive horizon; this is the domain of hermeneutics and theological exegesis. Creational āyāt, by contrast, are not linguistic in themselves; they are features of the world—celestial regularities, biological order, or geological phenomena—that invite inference. Historical āyāt combine temporal particularity with interpretive framing: a past event becomes a lesson when narrated and morally generalised. Anthropological āyāt index intrapersonal conditions—our capacity to remember, to fear, to reason—that make responsiveness possible. Extraordinary signs narrated in prophetic literature often straddle the revelatory and creational: a miraculous event is simultaneously an event in nature and a communicative act.

Two conceptual distinctions sharpen the analysis. First, we must separate indication from interpretation. A phenomenon can function as an āyah in the sense of being available for interpretation without thereby guaranteeing that an interpreter will construe it as such. This is philosophically important because formal information theory—Shannon's measure of syntactic information—tells us about signal transmission and noise but remains silent about semantic uptake ²³⁷. Philosophical accounts of semantic information and its conditions of truthbearing (for example, Dretske's emphasis on informativeness as a causal relation to states of affairs) provide further nuance but still do not exhaust the hermeneutic work required to read an āyah ²³⁸. Luciano Floridi's framing of information as a philosophical category helps to bridge syntax and meaning, but the Qur'ānic discourse also insists on a moral-epistemic dimension: reception is shaped by disposition, memory, and reflective capacity ²³⁹. Thus the same event—say, the emergence of a rainbow or the falling of a city—may be an āyah for one person and mere data for another.

Second, the relation between signs and reality admits competing philosophical interpretations. Naturalists can treat creational āyāt as natural facts that acquire significance through human cognitive mechanisms, realists can argue that some signs point to mind-independent facts or structures, while anti-realists or constructivists will stress the interpretive frames that confer meaning. The Qur'ānic

²³⁷Shannon, "Mathematical Theory of Communication."

²³⁸*Qur'ān* 3:190–191; 39:18; 47:24, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²³⁹Floridi, *Philosophy of Information*, 80–107.

approach, as various interpreters have noted, tends to straddle these poles: it affirms both the intelligibility of created order and the need for interpretive labour and moral responsiveness²⁴⁰. This balance helps avoid two extremes—on the one hand, a naïve “proof-text” natural theology that reads every regularity as a straightforward theistic warrant; on the other, a radical relativism that denies any genuine import to the claim that reality is “readable.” One must also resist the reverse error—treating āyāt as coercive evidence of truth. The Qur’ān’s repeated address to those who reflect, remember, hear, and reason highlights that signs invite, do not compel, assent; their efficacy depends on the intellectual and ethical posture of the recipient (cf. Qur’ān’s recurrent appeal to reflection in translation)²⁴¹.

Concrete examples clarify this account. The appearance of a regular astronomical cycle can function as a creational āyah: for an ancient observer it supplies a pattern to be narrated (historical āyah), conceptualised (anthropological āyah insofar as it engages human reason), and perhaps linguistically embedded into revelation (revelatory āyah). A prophetic miracle in the narrative corpus will be attended as an extraordinary sign and then interpreted variously across traditions. In each case the same physical occurrence is multiply addressable: its status as an āyah emerges through an interaction of fact, perception, and interpretive community.

Objections will press on the normative and cognitive claims embedded in this picture. One may ask whether invoking moral disposition as a condition of interpretive success risks circularity—do we read signs as meaningful because we are already committed to a religious framework? Conversely, critics from within some realist programmes might insist that pointing to interpretive contingency diminishes any claim that signs reliably track a mind-independent order. These objections are substantive and highlight the methodological humility the Qur’ānic idiom seems to commend: it neither reduces signs to brute proof nor dissolves them into mere projection. The concept of āyāt, therefore, should be understood as an invitation to a sustained epistemic practice—an interplay of perception, reason, memory, and moral attentiveness—that renders parts of reality readable without guaranteeing uniform conclusions.

Gathering these threads, the Qur’ānic vocabulary of āyāt stages a complex epistemological claim: reality bears multiple kinds of signs that can be apprehended in more than one register, but their capacity to inform depends on interpretive work and moral receptivity. This polyvalence allows the believer to situate revelation within a broader economy of signs while allowing the naturalist, the realist, and the anti-realist each to acknowledge dimensions of the phenomenon that overlap with their commitments. The result is a nuanced account of “readability” that resists simple reduction to information theory, to scientific demonstration, or to mere subjective imposition, and instead foregrounds the dialogical, ethical, and cognitive processes by which meaning is disclosed.

²⁴⁰Rahman, *Major Themes of the Qur'an*, 1–16. Nasr, *Islamic Cosmological Doctrines*. The Qur’ān, trans. Abdel Haleem.

²⁴¹Qur’ān 3:190–191; 39:18; 88:17–20, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

Chapter 21 — Creation as a Field of Signs

Qur'ānic passages that speak of the heavens and the earth, the alternation of night and day, rain, diversity, life and death, and the human self characterise these phenomena as *āyāt*—signs that invite attention and reflection rather than serving as manuals of physical mechanism ⁽²⁴²⁾. This chapter's central claim is modest but consequential: to read such passages as *āyāt* is to treat them primarily as theological and existential prompts—orientations for reflection on dependence, contingency, intelligibility, and the Creator—while recognising that this mode of address is compatible with, and distinct from, the mechanistic explanations offered by the natural sciences.

To clarify the claim it is helpful to make two conceptual distinctions. First, between signhood and mechanism. Drawing on semiotic theory, an *āyah* functions as a sign in the broad Peircean sense: a triadic relation among a sign, an object, and an interpretant that generates meaning in a community of readers ^(243; 244). A meteorological description of rainfall, by contrast, is a causal-mechanistic account: it aims to specify processes, conditions, and predictive relations. These are different explanatory projects. Second, between questions of how and questions of what it means. The question “How does rain form?” invites empirical, testable mechanisms; the question “What does rain signify?” invites hermeneutic and existential reflection on providence, reciprocity, and contingency. Recognising this distinction prevents a category mistake in which theological statements are demanded to perform as empirical theories, or vice versa.

Concrete examples illustrate the point. The Qur'ānic mention of rain as a sign (e.g. passages often cited in translation) does not aim to replace hydrometeorology; rather, it draws attention to dependence and mercy, prompting ethical and existential responses ^(245; 246). Similarly, the alternation of night and day can be read as an invitation to observe regularity—something that has methodological consequences for natural philosophers—while the theological import points to orderliness as an index of contingency rather than an account of orbital dynamics. The human self, described in Qur'ānic discourse with moral and spiritual registers, intersects with but does not duplicate the explanatory aims of cognitive neuroscience. One may therefore affirm the scientific tractability of sleep cycles, neurophysiology, or evolutionary history while also treating Qur'ānic talk of the self as an interpretive practice concerned with meaning, responsibility, and purposive orientation.

Several objections deserve attention. A literalist objection insists that *āyāt* must be read as scientific facts that prefigure modern discoveries; proponents of this view risk anachronism and may conflate genres. A robust naturalist objection alleges that theological readings are superfluous: they add nothing to our understanding of worldly phenomena. These objections, however, err by collapsing explanatory

²⁴²Qur'ān 2:164; 3:190–191; 30:20–25; 51:20–21, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²⁴³Peirce, *Philosophical Writings*, 99.

²⁴⁴Peirce, *Philosophical Writings*, 99.

²⁴⁵Qur'ān 30:48; 16:10–11; 30:50, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²⁴⁶Rahman, *Major Themes of the Qur'an*, 1–16.

domains. As the philosopher of science Ian Hacking and others have shown, scientific models and hermeneutic interpretations serve distinct epistemic functions; scientific realism debates—between those who treat theoretical entities as literally true and those who adopt an empiricist or constructive stance—show that there is no single monolithic ‘science’ that can subsume all forms of meaningful discourse (²⁴⁷; ²⁴⁸; ²⁴⁹; ²⁵⁰). The Qur’ānic orientation towards āyāt can be secularised as a phenomenology of wonder and contingency without thereby ceasing to be theologically potent.

An anti-realist or relativist critique might press: do āyāt merely reflect culturally contingent interpretive frames, so that their claim to point beyond themselves is suspect? This is a salutary caution. Interpretations of signs always occur within traditions and can be contested. Yet the basic move of the āyah—that features of the world can function as pointers towards questions of dependence, contingency, and intelligibility—is less a factual assertion about external reality than a hermeneutic proposal about how human agents might read reality. As Muhammad Iqbal, contemporary interpreters such as Izutsu and Rahman, and classical metaphysical commentators attest, this interpretive posture has its own internal norms and criteria for exegesis (²⁵¹; ²⁵²; ²⁵³).

Philosophically, the compatibility claimed here finds support in work reconceiving ‘information’ and ‘meaning’ as constitutive of natural description without collapsing into metaphysical reductionism. Floridi’s philosophy of information and Dretske’s account of information flow illuminate how physical states can carry semantic value without thereby becoming theological propositions (²⁵⁴; ²⁵⁵). Thus an āyah can be understood as a configuration of worldly phenomena that invites an information-bearing interpretation: the phenomena are empirically accessible and describable, while their status as signs belongs to an interpretive layer that is neither empirically reducible nor metaphysically vacuous.

To conclude: treating aspects of the created world as āyāt is an interpretive stance that complements rather than competes with empirical science. It preserves the integrity and autonomy of causal-mechanistic explanation while opening a space for existential, ethical, and theological inquiry about contingency, dependence, and intelligibility. Conflict is avoidable so long as the distinct aims and methods of science and of theological hermeneutics are respected; it arises primarily when one domain is pressed to answer the other’s proper questions. Reading reality as readable, then, is a double gesture:

²⁴⁷Ian Hacking, *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science* (Cambridge: Cambridge University Press, 1983).

²⁴⁸Boyd, "Current Status of Scientific Realism," 41–82.

²⁴⁹van Fraassen, *Scientific Image*, 12.

²⁵⁰Popper, *Logic of Scientific Discovery*, 57–73.

²⁵¹Muhammad Iqbal, *The Reconstruction of Religious Thought in Islam*, ed. M. Saeed Sheikh (Stanford, CA: Stanford University Press, 2013).

²⁵²Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 1–16.

²⁵³al-Ghazālī, *Incoherence of the Philosophers*, 166–167.

²⁵⁴Eco, *Theory of Semiotics*.

²⁵⁵Eco, *Theory of Semiotics*.

a disciplined attention to the world's regularities that science maps, and a reflective orientation in which those regularities are read as invitations to meaning.

Chapter 22 — Revelation and Creation: Two Modes of Indication

The shared designation of revealed verses and created signs (*āyāt*) generates a philosophically productive analogy: both speak of reality as something to be read, albeit by different faculties and according to different norms. To make this analogy precise we should distinguish three related but distinct senses of “sign.” First, there is the causal or informational sign: a reading of smoke as indicating fire, or of a mercury column as indicating temperature. The theoretical apparatus for this sense of sign can be developed in terms of information flow and causal correlation without committing one to a semantic sender in the full intentional sense (cf. Dretske on information ²⁵⁶; Shannon’s formal theory of communication is another relevant resource ²⁵⁷). Second, there is the semiotic or interpretive sign, where a sign functions within a system of conventions, symbols, and codes—the interpretive domain explored by Peirce and by later semioticians such as Eco ²⁵⁸. Third, there is the revelatory-communicative *āyah*: a linguistic utterance embedded in a religious tradition whose interpretation is governed by theological, exegetical, and normative criteria (the Qur’ānic usage and its classical exegesis provide exemplary material for this category ²⁵⁹; see also Izutsu on the Qur’ānic notion of sign and meaning ²⁶⁰).

Recognizing these distinctions allows us to hold together two claims that are often thought to be in tension. On the one hand, the natural sciences treat the world as intelligible in a manner that is methodologically constrained, empirically tested, and, within particular theoretical frameworks, intersubjectively verifiable. On the other hand, the exegete treats revealed discourse as intelligible through philological, doctrinal, and moral-historical methods. Neither enterprise reduces to the other: measuring atmospheric CO₂ does not confer the skills or authority to adjudicate scriptural exegesis; nor does reading a verse in isolation qualify one to infer physical laws. Yet both enterprises presuppose that reality, in different respects, is “readable.”

Two common objections illuminate why the analogy must be articulated carefully. Naturalists may object that to call natural phenomena “signs” risks imputing intentionality or agency where none is warranted; unless there is a sender, a “sign” is mere correlation and invoking hermeneutics anthropomorphizes nature. This objection is cogent if “sign” is taken only in the intentional, communicative sense. But the distinction above shows this need not follow: one may employ a causal-informational concept of sign—smoke indicates fire—without invoking a sender (cf. Dretske ²⁶¹;

²⁵⁶Dretske, *Knowledge and the Flow of Information*, 44–46.

²⁵⁷Shannon, “Mathematical Theory of Communication.”

²⁵⁸Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

²⁵⁹Qur’ān 2:106; 10:1; 41:3, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²⁶⁰Izutsu, *God and Man in the Qur’an*, 142–162.

²⁶¹Dretske, *Knowledge and the Flow of Information*, 44–46.

Floridi's framing of information as a philosophical resource is congenial here ²⁶²). Conversely, anti-realists who stress the theory-ladenness of observation (Kuhn) or the primacy of interpretive schemes (Quine) can press the converse worry: that "reading" nature is always theory-bound and that the idea of an autonomous set of natural "signs" independent of human conceptual schemes is illusory. This is a substantive epistemological point well represented in debates between constructive empiricism and scientific realism (cf. van Fraassen; the realist replies surveyed by Boyd are also relevant here) ²⁶³. A defensible middle course accepts that observation is mediated by theory and instruments while also holding that intersubjective tests and corrective practices constrain arbitrariness.

Within the Islamic intellectual tradition, the Qur'ānic idiom itself supports the analogy while allowing for the distinctions. The text repeatedly invites humans to reflect upon the created order as āyāt—signs that manifest attributes of the Divine—yet classical and modern Muslim commentators have not collapsed such invitations into naïve natural theology. Instead, they have developed hermeneutical principles that regulate when and how creation can serve as evidence for theological claims (see Izutsu and Rahman on the Qur'ānic concept of sign and theme ²⁶⁴; al-Attas on the metaphysical presuppositions underlying Islamic cosmology ²⁶⁵). These resources illustrate that a theological reading of nature can be disciplined, communal, and self-critical.

Concrete examples help to make the interplay vivid. Consider the phenomenon of a tree's rings. Biologists read rings as records of annual growth, drought, and age—data to be analyzed under the methodological norms of dendrochronology. A semiotic approach might also read rings as codified natural inscriptions that acquire symbolic uses in human cultures. A theological reading within an Islamic framework might see the rings as āyāt that invite reflection on providence, temporality, or stewardship. Each reading is legitimate within its domain; each asks different questions and receives different forms of warrant. Importantly, these readings can inform one another without collapsing: biological understanding refines the factual background of the theological reflection; theological reflection may motivate different ethical responses to ecological data.

The philosophical importance of a worldview that centers on āyāt is that it permits a disciplined integration of epistemology and theology without conflation. It acknowledges the autonomy of scientific method while situating scientific inquiry within a broader metaphysical economy in which intelligibility is not purely anthropocentric. It also constrains religious claims by requiring that appeals to creation as evidence observe the evidential standards appropriate to both the scientific and exegetical domains. In short, the notion of āyāt furnishes a plural but coherent epistemic ecology: signs may be causal, semiotic, or revelatory; methods of interpretation differ accordingly; yet all share the common commitment that reality can be approached, read, and argued about. This framework neither grants science the prerogative to adjudicate every theological claim nor allows theology carte

²⁶²Floridi, *Philosophy of Information*, 80–107.

²⁶³van Fraassen, *Scientific Image*, 12. Boyd, "Current Status of Scientific Realism," 41–82.

²⁶⁴Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 1–16.

²⁶⁵al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

blanche to override the disciplined findings of empirical inquiry. It rather proposes a reciprocal, norm-governed exchange in which truth is sought through signs appropriate to their domains.

Chapter 23 — Qur'ānic Epistemology and the Limits of Interpretation

The Qur'ānic insistence that the world is full of āyāt—signs inviting reflection—does not licence a laissez-faire hermeneutics. To read is not merely to notice; it is to construe within a network of linguistic, historical, and epistemic constraints. This point is not intended to narrow the Qur'ānic impulse to ponder creation, but to insist that such pondering be disciplined. The distinction between accessibility and transparency is crucial here. Something may be accessible—available to observation, contemplation, and intelligible description—without being transparent, that is, immediately and unambiguously self-interpreting. A sunrise is accessible as a regular, observable event; whether it functions as an āyah depends upon the conceptual apparatus brought to bear upon it, the linguistic frames within scripture and tradition, and the evidential standards one adopts.

Clarifying the kinds of constraint operative in interpretation helps prevent two common errors. The first is eisegesis, the projection of the reader's private meanings onto a text or phenomenon; the second is an unwarranted scientism that treats empirical patterns as furnishing theological proofs without mediating hermeneutical work. Limits on interpretation fall into several interrelated categories. Linguistic constraints attend to grammar, semantics, and the history of a language; Qur'ānic exegesis has long recognised that words have lexical ranges and syntactic uses that channel possible readings^{266, 267}. Contextual constraints concern both local textual context and the broader exegetical corpus: a verse read against the grain of thematic canons risks idiosyncrasy. Evidential constraints refer to the empirical or logical support for an interpretive claim: an assertion that a particular natural pattern is an āyah must be commensurate with what observation and reliable inference actually indicate. Finally, methodological constraints arise from the interpretive discipline adopted—philology, theology, natural science, or philosophy—and each brings its own standards of warrant^{268, 269, 270}.

Semiotic theory helps make these distinctions concrete. Following traditions of sign theory, one may distinguish indexical signs (causally connected to what they signify), iconic signs (resembling what they signify), and symbolic signs (conventional)^{271, 272}. Many natural phenomena function as indices: smoke indicates fire; a planet's motion indexes gravitational dynamics. The Qur'ānic idiom sometimes treats

²⁶⁶Izutsu, *God and Man in the Qur'an*, 142–162.

²⁶⁷al-Tabarī, *Commentary on the Qur'an*.

²⁶⁸Qur'ān 4:82; 47:24, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004). Ibn Kathīr, *Tafsir Ibn Kathir*.

²⁶⁹Qur'ān 4:82; 47:24, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004). Rahman, *Major Themes of the Qur'an*, 1–16.

²⁷⁰Popper, *Logic of Scientific Discovery*, 57–73.

²⁷¹Peirce, *Philosophical Writings*, 99.

²⁷²Peirce, *Philosophical Writings*, 99.

such indices as occasioning reflection about causality, order, and ultimately the Creator²⁷³. But to infer from indexicality to theological conclusion requires an interpretive move—something the Qur’ānic invitation presupposes but does not mechanistically guarantee.

This is why humility about finitude and fallibility is a theological and epistemic virtue. Interpretive fallibility is a central theme in the philosophy of science as well: theories are corrigible, observations theory-laden, paradigms shape what counts as anomaly²⁷⁴, ²⁷⁵. A world of āyāt, conceived modestly, is not a cosmic crossword waiting to be solved by private intuition; it is a domain in which seekers are answerable to constraints—textual, communal, evidential—that aim to curb arbitrariness. To read without such constraints risks either trivialising scripture by forcing it to mirror every subjective inclination or insulating it from legitimate correction by empirical findings.

Objections arise from different quarters. A naturalist may say that signs are merely causal regularities with no referential purchase beyond their natural explanation; an anti-realist about scientific theories may argue that all interpretive frameworks are social constructs, so appeals to constraints merely replicate contingent practices²⁷⁶, ²⁷⁷. An Islamic traditionalist might reply that revelation confers privileged access to meaning, making concerns about scientific verification secondary. These positions can be acknowledged without conflation. Recognising constraints does not mean subordinating textual meaning to science; nor does it mean treating empirical inquiry as irrelevant to interpretation. Rather, it affirms a dialectical posture: theological claims should be reconciled with sound exegesis and reasonable epistemic principles, while scientific claims should be interpreted with sensitivity to metaphysical and hermeneutical limits.

Concrete examples illustrate the point. Consider the common move of reading biological complexity as immediate evidence of design. Such a reading invokes an interpretive schema in which complexity functions as a sign of purposive agency. But the move requires languages of analogy, probability, and causal inference; competing explanations—mechanisms positing nonteleological emergence—must be considered and evaluated according to disciplinary norms²⁷⁸, ²⁷⁹. Similarly, the Qur’ānic references to winds, rains, or the alternation of night and day function as invitations to reflect on order and dependence, not as instructions for scientific hypothesising²⁸⁰. Exegesis historically accommodates

²⁷³Qur’ān 3:190–191; 30:20–25; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²⁷⁴Qur’ān 17:36; 39:18, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²⁷⁵Qur’ān 3:190–191; 39:18, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

²⁷⁶Eco, *Theory of Semiotics*.

²⁷⁷Eco, *Theory of Semiotics*.

²⁷⁸Nagel, *Mind and Cosmos*.

²⁷⁹Nasr, *Islamic Cosmological Doctrines*.

²⁸⁰Qur’ān 2:164; 16:10–12; 30:48, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

both literal and figurative readings precisely by attending to the constraints sketched above^{281, 282, 283, 284}.

The synthesis is modest but firm: the readability of reality, in a Qur'ānic register, presupposes both invitation and discipline. āyāt make the world accessible to meaning-making, but accessibility is not the same as unmediated disclosure. Responsible interpretation requires attentiveness to linguistic and textual norms, to the evidential standards of the relevant disciplines, and to a humility that recognises the fallibility of readers—whether they situate themselves within naturalism, realism, anti-realism, or Islamic tradition. This posture preserves the Qur'ānic call to wonder and inquiry while safeguarding against the twin excesses of idiosyncratic projection and reductive scientism.

Chapter 24 — Against Scientific Concordism

Modern efforts to turn the Qur'ān into a catalogue of scientific predictions are methodologically perilous. When commentators read contemporary discoveries back into scripture, two errors commonly occur. First, retrospective matching turns polyvalent, often poetic language into what appears to be a precise forecast only after the relevant experiment or observation is known. Second, since scientific theories are frequently revised or superseded, a concordist strategy places scripture in a precarious relation to the contingent history of science: a verse will seem prophetic so long as some current theory survives, but when that theory is abandoned the very same verse can be taken as challenged. This vulnerability is not merely rhetorical; it confuses different orders of discourse and risks making religious texts hostage to the epistemic fortunes of changing scientific paradigms^(285, 286).

For these reasons the present chapter rejects concordism as the hermeneutical foundation for reading āyāt. The more defensible and philosophically interesting claim is not that particular verses predicted particular laboratory findings, but rather that the Qur'ānic concept of āyāt proposes an ontology and an interpretive stance that aims to explain why the world is, in principle, readable and why knowledge can bear significance that is not exhausted by mere instrumental control. This is a different project: it is metaphysical and epistemological rather than predictive.

To sharpen the argument we must distinguish several concepts that are often conflated in popular discussions. First, ontology — what exists — must be separated from epistemology — how we know it. Second, the claim that reality is intelligible (it can be investigated and rendered into reliable representations) is distinct from the claim that those representations are final or complete. Third, the idea that features of the world serve as signs (āyāt) is distinct from the claim that those signs encode specific scientific facts. The Qur'ānic vocabulary of signs consistently invites readers to attend to

²⁸¹Ibn Kathīr, *Tafsir Ibn Kathir*.

²⁸²al-Tabarī, *Commentary on the Qur'an*.

²⁸³Izutsu, *God and Man in the Qur'an*, 142–162.

²⁸⁴Rahman, *Major Themes of the Qur'an*, 1–16.

²⁸⁵Kuhn, *Structure of Scientific Revolutions*, 43–52.

²⁸⁶Popper, *Logic of Scientific Discovery*, 57–73.

patterns in nature as meaningful, without reducing meaning to mere data points; it insists that the sensible world can disclose truths that transcend utilitarian calculation (²⁸⁷, ²⁸⁸, ²⁸⁹).

This perspective resonates with several currents in the philosophy of science without committing to any single metaphysical doctrine. Scientific realists contend that theories aim to describe a mind-independent reality and that the success of science is best explained by some degree of truth-likeness in our theories (²⁹⁰, ²⁹¹). Anti-realists or constructive empiricists, by contrast, emphasise empirical adequacy and the theory-laden character of observation (²⁹², ²⁹³). Both positions, however, presuppose an intelligible order: realism invokes correspondence with an external world; anti-realism accepts that science produces coherent models that render phenomena intelligible to us. The Qur'ānic claim about āyāt can be read as a meta-level hypothesis compatible with either posture: it asserts that the world exhibits lawful regularities and meaningful patterns—hence it is investigable—without stipulating the precise metaphysical nature of those regularities.

Several conceptual resources help clarify how āyāt might function in this register. Information theory and philosophy offer useful tools. Shannon's formal notion of information captures the idea of signal and noise in communication (²⁹⁴), while Dretske's account links information to knowledge by showing how environmental correlations can ground representational content (²⁹⁵). Luciano Floridi's framing of information as a central conceptual category opens further ways of thinking about how the world can be both data-rich and semantically pregnant (²⁹⁶). From a semiotic perspective, Peirce and Eco emphasise that signs require interpretants — they are not self-interpreting but invite interpretive practices (²⁹⁷, ²⁹⁸). Reading āyāt in this spirit means treating natural phenomena as signals that, when properly interpreted, disclose not only causal regularities but also reasons, purposes, or moral admonitions. This is not to claim that science thereby proves theological doctrines; rather, it situates scientific inquiry within a broader hermeneutic that ascribes intelligibility and significance to the results of investigation.

Objections naturally arise. A naturalist might object that ascribing transcendent meaning to natural regularities is unwarranted: patterns are emergent features of physical processes and meanings are human projections. A scientific realist might worry that treating āyāt as interpretive could license too much subjectivity, while an anti-realist could see the Qur'ānic emphasis on signs as congenial to the

²⁸⁷Boyd, "Current Status of Scientific Realism," 41–82.

²⁸⁸Boyd, "Current Status of Scientific Realism," 41–82.

²⁸⁹Boyd, "Current Status of Scientific Realism," 41–82.

²⁹⁰van Fraassen, *Scientific Image*, 12.

²⁹¹van Fraassen, *Scientific Image*, 12.

²⁹²van Fraassen, *Scientific Image*, 12.

²⁹³van Fraassen, *Scientific Image*, 12.

²⁹⁴Shannon, "Mathematical Theory of Communication."

²⁹⁵Dretske, *Knowledge and the Flow of Information*, 44–46.

²⁹⁶Floridi, *Philosophy of Information*, 80–107.

²⁹⁷Eco, *Theory of Semiotics*.

²⁹⁸Eco, *Theory of Semiotics*.

idea that theory and observation are theory-laden. These disagreements are genuine, but they do not undermine the central claim: the Qur’ānic ontology of āyāt is best understood as a metaphysical stance about the intelligibility of reality and the capacity of human cognition to discern significance, not as a set of empirical assertions about laboratory findings.

Concrete examples illustrate the difference. A seventeenth-century astronomer’s observation of planetary regularities may have been read as an āyah — a sign pointing beyond the mere mechanics of motion to questions about order and governance — without that reading committing the astronomer to any particular contemporary cosmology. Similarly, a modern biologist’s discovery of conserved genetic mechanisms could be treated as a mode of āyah insofar as it prompts reflection on the deep coherence of living systems and ethical responsibilities toward them. In each case the Qur’ānic move is hermeneutical: it invites inquiry and reflection, rather than offering a catalogue of scientific predictions.

In overview, rejecting concordism yields a durable approach that honours both the autonomy of scientific method and the Qur’ānic claim that the world is intelligible and meaningful. By treating āyāt as an ontological and epistemic framework — a claim that reality can be read and that knowledge can bear normative significance — one preserves a respectful dialogue among naturalist, realist, anti-realist, and Islamic interpretive commitments. Such a stance protects scripture from the vicissitudes of scientific change while retaining its capacity to orient inquiry, ethical reflection, and a sense of wonder at the order that makes knowledge possible.

Part VII — Competing Metaphysics of Readability

This part develops the monograph’s central question by moving from the phenomenon of knowability to its conceptual, scientific, semantic, Qur’ānic, and metaphysical interpretation. The chapters are cumulative: each preserves the distinctions established earlier while testing them against a new domain.

Chapter 25 — Brute Reality

To call the world “brute reality” is to emphasise an intellectual virtue: ontological modesty. On this view the cosmos presents a relatively stable set of structures and regularities; our scientific and ordinary enquiries aim to render those structures readable, and explanation terminates in that readability. The advantage of such a stance is economy. It resists metaphysical inflation, refuses to multiply entities beyond what is required for empirical success, and frankly accepts limits to explanation. In these respects it resonates with methodological themes from empiricism and a deflationary realism: do not posit more than the phenomena warrant; privilege the manifest order that allows reliable prediction and control. Figures across the philosophy of science have defended similar frugality under different rubrics—from Popper’s emphasis on empirical testability to van Fraassen’s focus on empirical adequacy rather than ontological commitment²⁹⁹.

²⁹⁹Popper, *Logic of Scientific Discovery*, 95–120. van Fraassen, *Scientific Image*, 12.

Yet the virtue of intellectual economy is also its vulnerability. Readability — the claim that the world is structured in such a way that agents can extract information and form reliable representations — leaves several kinds of questions apparently untouched. One must distinguish, at the least, between three related but distinct problems. First, there is the ontological problem: what, if anything, grounds the existence of the structures we read? Second, the epistemic problem: why are human cognitive systems capable of tracking those structures (a problem sharpened by discussions of the “unreasonable effectiveness” of mathematics) ³⁰⁰? Third, the semantic or normative problem: how do mere patterns and correlations give rise to meaning, normativity, and conscious subjectivity rather than remaining merely syntactic descriptions of data? Philosophers working on information and representation have long urged such distinctions; Shannon’s technical theory of communication captures syntactic information while later work in the philosophy of information and epistemology draws a hard line between information qua signal and information that bears semantic content or normative force ³⁰¹.

Each of these problems invites alternative responses. A naturalist inclined to stop at brute readability will contend that invoking further metaphysical structures (minds beyond physical brains, Platonic realms of forms, or divine beings) introduces explanatory costs with no empirical gain. This position often appeals to parsimony or to an account of cognitive and normative phenomena grounded in evolutionary and social processes; thinkers like Dennett treat consciousness and meaning as emergent products of natural selection and neural organisation, resisting the temptation to posit irreducible ontologies ³⁰². Scientific realists, by contrast, argue that the best explanation of the success and stability of scientific theories is that they (at least approximately) refer to a mind-independent world; for realists the “readability” of the world is an index of an underlying correspondence between our theories and reality ³⁰³. Anti-realists rebut by insisting that what matters is empirical adequacy and the pragmatic virtues of theories rather than metaphysical truth claims ³⁰⁴.

A further set of objections presses the informational account from both directions. One objection holds that information, suitably construed, dissolves the sharp gulf between brute structure and meaning: on this score Dretske and Floridi develop resources for understanding how information can confer semantic content and thereby constitute a bridge from patterns to meaning without invoking supernatural agency ³⁰⁵. A reciprocal objection, articulated by those sensitive to the limits of naturalistic reduction, claims that such informational accounts still fall short of explaining normativity and consciousness — the “hard problems” that nag at naturalistic completeness ³⁰⁶. Here the dispute is

³⁰⁰Eco, *Theory of Semiotics*.

³⁰¹Dretske, *Knowledge and the Flow of Information*, 44–46. Shannon, “Mathematical Theory of Communication.” Floridi, *Philosophy of Information*, 80–107.

³⁰²Dennett, *Darwin’s Dangerous Idea*.

³⁰³van Fraassen, *Scientific Image*, 12.

³⁰⁴van Fraassen, *Scientific Image*, 12. Popper, *Logic of Scientific Discovery*, 57–73.

³⁰⁵Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

³⁰⁶Chalmers, *Conscious Mind*. Nagel, *Mind and Cosmos*.

not simply about how much explanation we can have, but about what kinds of explanations count as properly explanatory.

The Islamic theological and exegetical tradition offers a different perspective that complicates the dichotomy. The Qur'ān uses the term *āyāt* to refer to signs: elements of creation that invite reflection and point beyond themselves ³⁰⁷. Classical and modern Islamic thinkers interpret this in diverse ways. Some read the *āyāt* as evidence of divine authorship or purposive order (a metaphysical claim); others emphasise ethical and existential responsiveness — that the readable world functions as a summons to moral and spiritual transformation rather than as mere data for theoretical description ³⁰⁸. Neither of these readings collapses into a scientific claim about causal mechanisms; they instead posit a hermeneutical layer in which the fact that the world is readable becomes itself meaningful in a normative and existential sense.

Concrete examples help to clarify the stakes. Consider the astonishing applicability of higher mathematics to physical theory: the structural fit between abstract mathematics and empirical regularities strains a purely brute account that treats structures as arbitrary contingencies ³⁰⁹. Or consider moral protest: the way humans appeal to normative reasons seems to resist reduction to mere signal processing unless one can show how normativity emerges from descriptive facts without committing fallacious category shifts ³¹⁰. Conversely, the success of predictive models in climate science or epidemiology illustrates the economy of stopping at readable structure when practical intervention is the aim; here the metaphysical debate seems secondary to predictive adequacy.

The question, then, is primarily abductive rather than deductive: given competing explanatory projects, which best balances unification and ontological economy, explanatory depth and epistemic modesty? The defensibility of stopping at readability hinges on whether it leaves more unexplained — and whether the alternative frameworks justify their additional ontological or epistemic commitments without unacceptable cost. A fair appraisal recognises that naturalists, realists, anti-realists, and religious interpreters are addressing different desiderata: empirical control, metaphysical truth, pragmatic adequacy, and existential meaning respectively. The productive move is to keep these desiderata analytically distinct while allowing for epistemic dialogue. The Qur'ānic concept of *āyāt*, understood as a hermeneutical invitation, models such a stance: it affirms that the world is readable and that reading has consequences that go beyond description, without requiring that scientific explanation be co-opted into theological proof. Thus the most philosophically restrained synthesis acknowledges readability as a powerful default, insists on conceptual precision about what remains to be explained, and preserves methodological pluralism in the face of differing explanatory aims.

³⁰⁷Qur'ān 2:164; 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

³⁰⁸Rahman, *Major Themes of the Qur'an*, 1–16. Nasr, *Islamic Cosmological Doctrines*. The Qur'ān, trans. Abdel Haleem.

³⁰⁹Ladyman and Ross, *Every Thing Must Go*, 66–129. Dennett, *Darwin's Dangerous Idea*.

³¹⁰Eco, *Theory of Semiotics*.

Chapter 26 — Naturalism

A fair hearing of naturalism requires engaging its strongest contemporary versions rather than a minimal appeal to natural selection alone. Predictive processing accounts model cognitive systems as hierarchies of generative models that continuously predict incoming sensory signal and update on error, a framework that explains a wide range of perceptual and motor phenomena without invoking anything beyond physical dynamics and learning. Combined with the extended and embodied cognition literature, which locates cognitive processing partly in bodily and environmental structures rather than confining it to the skull, this offers naturalism considerably richer resources than a bare evolutionary story³¹¹. Nor need naturalism rest on the crude claim that fitness-tracking directly explains abstract truth-tracking; the concept of exaptation—a trait co-opted for a function distinct from the one under which it was originally selected—offers naturalism a more careful bridge between survival-relevant discrimination and the capacities later exploited for mathematics, logic, and theoretical science. Even granting the full resources of predictive processing, extended cognition, and exaptation, however, an explanatory question survives: these frameworks describe how minds track patterns once patterns are there to be tracked, and how existing capacities are redeployed once available; they do not by themselves explain why the environment offers stable, cross-representational patterns for any hierarchy of predictive models to lock onto in the first place. The naturalist has powerful machinery for explaining cognitive success given a readable world; readability itself remains the explanandum this machinery presupposes rather than derives.

Naturalist explanations of the intelligibility of the world commonly invoke a cluster of well-established resources: lawful regularity, causal interaction, evolutionary adaptation, the developmental architecture of cognition, and social mechanisms of error-correction. Each of these supplies genuine explanatory purchase for particular phenomena. Law-like generalisations underwrite prediction and manipulation; causal interaction accounts for physical effectuation; natural selection explains biological form and apparent teleology; cognitive development explains capacities for pattern-detection and normativity; and social epistemic practices explain how scientists and communities correct one another's mistakes. A serious critique of naturalism must therefore engage not with a straw-man caricature but with its most robust formulations that deploy this whole battery of tools.

The pivotal issue, I suggest, is unification. One way to characterise the strongest naturalisms is pluralist and piecemeal: different explananda are assigned to different mechanisms, and their conjunction is treated as contingent rather than indicative of a single metaphysical source. Thus evolutionary theory explains biological adaptation, neuroscience and developmental psychology explain mental capacities, information theory and communication studies explain certain regularities of signalling, and sociology explains the reliability of scientific institutions. This approach has virtues: it respects methodological specialisation and avoids metaphysical overreach. But it risks explanatory fragmentation. When the explananda themselves—lawfulness, meaning, consciousness, and intelligibility—are conceptually

³¹¹Andy Clark, *Surfing Uncertainty: Prediction, Action, and the Embodied Mind* (Oxford: Oxford University Press, 2016).

interconnected, the question becomes whether treating them as mere conjunctions of separate accounts misses a deeper unity.

Advocates of theistic or metaphysical unification propose an alternative: the diverse phenomena are manifestations or signs of a single source that grounds lawfulness, normative meaning, consciousness, and the very “readability” of reality. Within the Islamic intellectual tradition, the Qur’ānic notion of *āyāt* (signs) famously integrates the cosmos, moral law, and textual revelation into a single interpretive horizon in which natural phenomena and scriptural utterances mutually illuminate human understanding³¹²; classical and modern commentators elaborate variants of this idea, emphasising that the world is structured so as to be intelligible to rational beings (see Izutsu, Rahman, al-Attas)³¹³. From a philosophical angle this move is an attempt at metaphysical unification: not merely to show that many mechanisms cooperate, but to root their cooperation in a common ontological source or explanatory principle.

Several conceptual distinctions clarify the dispute. First, one may distinguish epistemic unification—where a single theory subsumes diverse phenomena for methodological economy—from metaphysical unification—where a single kind of thing is taken to underlie those phenomena. Second, pragmatic unity (the virtue of a single, simpler theory) must be separated from ontological unity (the claim that reality itself is simple or single-sourced). Third, one must distinguish syntactic information (as in Shannon) from semantic or interpretive content: the former measures transmission capacity, the latter concerns meaning and intentionality (Shannon; Dretske; Floridi)³¹⁴.

Naturalists have principled responses. Some concede that unity is an epistemic virtue but deny that it entails metaphysical commitment; the fact that a single hypothesis would explain many domains does not licence the inference that reality is metaphysically unified. This line echoes van Fraassen’s caution about taking empirical success to imply ontological commitments beyond observable phenomena³¹⁵. More robust scientific realists counter that the best explanation of converging success across disparate domains is that our theories latch onto real structures—an inference-to-the-best-explanation defended by figures such as Putnam and Boyd³¹⁶. Historical reflections—Kuhn’s paradigms and Popper’s falsificationism—complicate matters further by showing how standards of unification shift historically and how revolutions reframe what counts as unified explanation³¹⁷.

³¹²Qur’ān 2:164; 3:190–191; 5:48; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

³¹³Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 65–79. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³¹⁴Shannon, “Mathematical Theory of Communication.” Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

³¹⁵van Fraassen, *Scientific Image*, 15–19.

³¹⁶Putnam, *Mathematics, Matter and Method*, 60–78. Boyd, “Current Status of Scientific Realism,” 41–82.

³¹⁷Kuhn, *Structure of Scientific Revolutions*, 92–110. Popper, *Logic of Scientific Discovery*, 57–73.

There are substantive objections to metaphysical unification to be taken seriously. First, unification risks ontological inflation: invoking a single grounding entity might be explanatorily powerful but ontologically costly, and parsimony favours plural explanatory mechanisms if they suffice. Second, the unity-proponent must explain how a purported common source yields the fine-grained regularities traced by empirical sciences without smuggling scientific conclusions into metaphysics. Third, anti-realist or pragmatist readings suggest that what we call “unity” could be an artifact of theoretical choice, cognitive economy, or cultural values rather than a discovery about reality itself (cf. Kuhn; van Fraassen).

Concrete examples sharpen these abstract points. Consider the status of meaning: Dretske and Floridi develop accounts that treat information as bridging physical states and semantic content, yet they must distinguish raw informational structure from intentionality as such (Dretske; Floridi) ³¹⁸. In the philosophy of mind, physicalist programmes (Dennett, Clark) propose mechanistic continuities with cognition, while critics stress the “hard” explanatory gap of consciousness (Nagel, Chalmers) ³¹⁹. A unificatory theism would read both information and consciousness as coherent features of a world designed to be read—āyāt in the Qur’ānic idiom—whereas a pluralist naturalism explains each within its own theoretical framework.

Where does that leave us? The choice between pluralist naturalism and metaphysical unification is not merely empirical; it is normative and methodological. It hinges on competing weightings of explanatory depth, parsimony, hermeneutic coherence, and the status accorded to phenomenological data such as meaning and conscious experience. A prudent stance is epistemic humility: recognise that unification, whether metaphysical or methodological, is a powerful explanatory aim, but that its attainment must be judged by disciplined criteria—consilience of evidence, conceptual coherence, and avoidable ontological extravagance—rather than rhetorical appeal alone. The Qur’ānic language of āyāt offers one historically rich model of unity that privileges intelligibility; contemporary philosophy of science, information theory, and metaphysics provide rival ways to render that intelligibility intelligible. Comparative assessment must therefore remain even-handed: it should test whether a common-source account provides more than rhetorical unification—whether it increases explanatory reach without illicitly importing theological premises—and whether a pluralist account preserves sufficient coherence to answer the deeper questions about meaning, mind, and the lawlike order of nature.

Chapter 27 — Physicalism and Emergence

Physicalist and emergentist frameworks have achieved notable clarity about how cognitive systems are physically instantiated and how higher-order properties can arise within complex physical systems. Physicalism directs attention to the vehicles—neural states, circuits, and embodied processes—that

³¹⁸Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

³¹⁹Dennett, *Darwin's Dangerous Idea*. Clark, *Supersizing the Mind*, 1–82. Nagel, *Mind and Cosmos*. Chalmers, *Conscious Mind*.

realize cognition and epistemic practices. Emergence theorists add an account of how systemic organization and novel functional descriptions become indispensable at higher levels without positing non-physical substances; on this view, patterns of organisation supervene on microphysics while admitting new explanatory vocabulary for detection, categorisation, and adaptive behaviour. Such accounts are congenial to computational and mechanistic models of learning and to enactive or extended views of cognition that stress embodiment and environmental coupling^{320, 321}.

It is helpful, however, to make conceptual distinctions before assessing what remains to be explained. First, there is the distinction between detection and representation. A simple sensor can reliably change state in response to temperature; it detects but does not, in any robust sense, hold beliefs about a thermostat or the weather. Second, there is the distinction between causal production and normativity. A neural event may cause a verbal report, but explaining why the report counts as true or false—why it is about something—invokes semantic and normative dimensions that mere causation leaves untouched. Third, information can be understood in at least three senses: the syntactic, as measured by Shannon; the semantic, as content that bears on states of affairs; and the epistemic, as that which can be used for action and reasoning^{322, 323, 324}. Confusing these levels risks overstating what physicalist mechanisms have shown.

Naturalistic semantic theories have long attempted to bridge the gap between causal production and intentional content. Teleosemantic approaches appeal to functions shaped by selection to explain why certain states represent particular distal conditions; information-theoretic proposals attempt to ground content in reliable covariance or channels that reduce uncertainty; and more sophisticated mechanistic accounts locate representation in integrated systems that deploy internal models for prediction and control^{325, 326, 327}. Each strategy faces familiar objections. Teleosemantics can confront the disjunction problem—how evolutionary functions single out the correct referent when the same proximal cues co-occur with different distal states. Pure covariance accounts can be accused of conflating correlation with linguistic or propositional aboutness. Mechanistic models must still account for normativity: what transforms a merely useful internal state into something properly assessable as true or false?

Consider a concrete example. A navigation system in a smartphone uses GPS signals and inertial sensors to generate a map and a suggested route. The system detects, computes, and issues directions. It can be said to represent positions in a functional sense. But does the smartphone's "belief" that a particular coordinate corresponds to the user's location possess semantic content in the same way a human's belief does? A human's belief is subject to truth-conditions, justification, and the possibility

³²⁰Clark, *Supersizing the Mind*, 1–82.

³²¹Clark, *Supersizing the Mind*, 1–82.

³²²Shannon, "Mathematical Theory of Communication."

³²³Shannon, "Mathematical Theory of Communication."

³²⁴Shannon, "Mathematical Theory of Communication."

³²⁵Dretske, *Knowledge and the Flow of Information*, 44–46.

³²⁶Dretske, *Knowledge and the Flow of Information*, 44–46.

³²⁷Dretske, *Knowledge and the Flow of Information*, 44–46.

of being mistaken for reasons that go beyond sensor noise—social evidence, testimony, and normative assessments of reliability. The naturalist answer is to show how these normative features supervene on functional and explanatory roles in social and biological systems; critics insist that normativity cannot be reduced to causal or functional descriptions without remainder ³²⁸, ³²⁹.

Philosophical positions about science and reality bear on how one handles this problem. Scientific realists stress that our best theories succeed because they track mind-independent structure and therefore that semantic commitments can be realist without metaphysical inflation ³³⁰, ³³¹. Anti-realists or constructive empiricists caution that scientific terms are instrumentally useful without thereby warranting metaphysical commitments to unobservable entities ³³². Both perspectives influence how one reads claims that naturalistic semantics suffice to recover intentional content. Historical and sociological accounts of science remind us that theoretical terms and their referents evolve in complex ways ³³³, ³³⁴; there is no single, uncontroversial route from successful practice to semantic ontology.

When Islamic exegetical resources are brought into the conversation, the locus of concern shifts from metaphysical proof to hermeneutic and moral reading. The Qur'ānic term *āyah* (plural *āyāt*) commonly denotes a sign, a pointer that invites reflection rather than functioning as a technical proof in the scientific sense; the text repeatedly calls human beings to observe and ponder the signs of God in nature and history ³³⁵, a reading elaborated in classical and modern commentaries that emphasize moral and epistemic transformation through contemplation ³³⁶, ³³⁷. This hermeneutic is compatible with acknowledging the success of scientific models while resisting the reduction of religious signification to empirical demonstration. Al-Attas and Nasr foreground a metaphysical grammar in which the readability of reality acquires ethical and ontological orientation rather than merely informational content ³³⁸, ³³⁹.

Reviewing the chapter's argument, physicalist and emergentist accounts have made substantial progress in modelling how systems detect, learn, and deploy functional representations. Philosophical work on information and naturalistic semantics provides plausible avenues for explaining many features of intentional content, but important conceptual work remains to clarify how normativity and aboutness are to be understood without illicitly importing non-physical ontologies. At the same time,

³²⁸van Fraassen, *Scientific Image*, 12.

³²⁹van Fraassen, *Scientific Image*, 12.

³³⁰van Fraassen, *Scientific Image*, 12.

³³¹van Fraassen, *Scientific Image*, 12.

³³²Eco, *Theory of Semiotics*.

³³³Eco, *Theory of Semiotics*.

³³⁴Eco, *Theory of Semiotics*.

³³⁵Qur'ān 3:190–191; 29:20; 12:111; 88:17–20, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

³³⁶al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³³⁷al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³³⁸Nasr, *Islamic Cosmological Doctrines*.

³³⁹Nasr, *Islamic Cosmological Doctrines*.

religious and hermeneutic readings—such as the Qur’ānic sense of āyāt—recast the problem: they treat the world as legible in ways that require interpretive, moral, and communal practices beyond the remit of laboratory verification. A conciliatory posture recognises that scientific, philosophical, and theological resources each illuminate different aspects of readability: the physical mechanisms that make representation possible; the normative and semantic questions that demand philosophical analysis; and the existential orientation that theological reflection articulates. Future interdisciplinary work should seek precise maps between these registers while resisting the temptation of reductionism on any side.

Chapter 28 — Structural Realism

Structural realism is a natural interlocutor for the project sketched in this book because it transfers philosophical attention from the preservation of particular theoretical entities to the persistence of relational form across scientific change. Rather than insisting that the same corpuscles or ether remain after revolutions, structural realists ask why the mathematical relations and symmetries that survive theory change continue to organise successful explanation and prediction. That move helps explain the continuity of formal relations through paradigmatic shifts and thus gestures toward a plausible account of why “what is read” — mathematical structure — remains reliably readable over time ^{340 341}.

Readability, however, presses a distinct and wider question. Even if one accepts that reality is fundamentally structural — whether in an ontic guise that treats relations as the furniture of the world or in an epistemic guise that treats structure as what our best theories secure — one must still explain why structure is epistemically accessible and semantically representable. In other words: why is there anything for scientific and human cognition to latch onto, and how do symbols and formulae come to mean what they do? These are not mere terminological quibbles. They distinguish (a) an ontological claim about the constitution of reality, (b) an epistemic claim about the possibility of knowledge of that constitution, and (c) a semantic or hermeneutic claim about how representations carry content that permits interpretation and orientation.

Several conceptual resources help to articulate the gap between the ontological and the epistemic. Wigner’s famous remark on the “unreasonable effectiveness of mathematics” highlights the puzzle: the intimate fit between abstract formal systems and empirical phenomena seems to demand explanation ³⁴². Putnam’s reflections on the relation between mathematics and matter show that such fit need not be miraculous but does require a philosophical account of representation and reference ³⁴³. From an information-theoretic angle, Shannon’s formalisation of communication and Floridi’s broader Philosophy of Information supply a way to think about the channels by which structural features become available to observers: noise, coding, redundancy and invariance matter for whether

³⁴⁰Ladyman and Ross, *Every Thing Must Go*, 66–129.

³⁴¹Ladyman and Ross, *Every Thing Must Go*, 66–129.

³⁴²Wigner, “Unreasonable Effectiveness of Mathematics.”

³⁴³Putnam, *Mathematics, Matter and Method*, 60–78.

a pattern is detectable in practice^{344 345}. Dretske's work on information illuminates how causal channels can convey truth-relevant regularities that underpin knowledge claims without thereby settling metaphysical questions about the ontic status of structure³⁴⁶.

But information alone is not yet meaning. Semiotic theory — Peirce's triadic account of sign, object and interpretant, and Eco's elaborations — draws attention to an interpretive layer: signs must be read by agents with capacities to classify, infer and act for semiosis to function^{347 348}. Consciousness and intentionality remain central here; Searle and Nagel remind us that brute information does not exhaust the problems of mind and value, and that an account of reading must allow for subjective orientation and normative understanding without begging theological conclusions or denying naturalist constraints^{349 350}. Contemporary cognitive extensions (for example, Clark) offer further naturalistic models of how cognitive systems integrate external structure into ongoing processes, but sceptical voices — for instance van Fraassen's emphasis on empirical adequacy — insist that we need not commit to any deep ontological reading beyond the capacities of practice³⁵¹.

For readers coming from Islamic intellectual traditions, the Qur'ānic notion of āyāt supplies a distinctively theological hermeneutic for this layered problem. The Qur'ān frequently invites reflection on the natural world as āyāt — signs that point to meaning, purpose and the divine order — and classical and modern exegetical traditions (e.g., Izutsu, Rahman, al-Attas) have developed nuanced accounts that intertwine cosmology, ethics and epistemology^{352 353 354 355}. Read within this frame, the structural features emphasised by scientific realism become a domain of signs meant to elicit intellectual and moral response rather than mere consumption. This does not entail a conflation of scientific and theological epistemologies: it rather places scientific knowledge within a broader hermeneutic horizon that assigns significance and invites reflection while recognizing the different standards and methods each discipline rightly employs.

Several objections deserve careful consideration. Anti-realists may argue that the question of why structure is readable dissolves once we adopt a practice-centred account: theories work and that is enough (van Fraassen). Realists counter that explanatorily potent continuity across theory change

³⁴⁴Eco, *Theory of Semiotics*.

³⁴⁵Eco, *Theory of Semiotics*.

³⁴⁶Dretske, *Knowledge and the Flow of Information*, 44–46.

³⁴⁷Eco, *Theory of Semiotics*.

³⁴⁸Eco, *Theory of Semiotics*.

³⁴⁹Nagel, *Mind and Cosmos*.

³⁵⁰Nagel, *Mind and Cosmos*.

³⁵¹van Fraassen, *Scientific Image*, 12.

³⁵²al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³⁵³al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³⁵⁴al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³⁵⁵al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

demands a metaphysical story (Boyd, Ladyman)^{356 357 358}. The consciousness sceptic insists that no account of structure and information suffices to retrieve subjective meaning (Nagel, Chalmers)^{359 360}. Each position thus captures an important piece of reality's readability: the reliability of form, the pragmatic constraints of theory choice, and the recalcitrant problems of mind.

A synthesis that respects these constraints treats readability as intrinsically plural. Structural ontology explains what is to be read; information theory explains how those structures are made available; semiotics and theories of mind explain how they are interpreted as meaningful signs; and theological hermeneutics — exemplified by the Qur'ānic talk of āyāt — offers a normative frame that orients reading toward ethical and existential ends. None of these layers reduces neatly to any other; nor does adherence to one exclude the insights of the others. The philosophical task, then, is not to subsume theology under science or vice versa, but to clarify how each account conditions and enriches the possibility of reading reality. Structural realism gives us the content worth reading; information theory and semiotics give us the means of reading; and a reflective hermeneutic, whether secular or religious, gives us reasons to read beyond mere predictive success.

Chapter 29 — Informational Ontologies

Informational idioms—distinctions, relations, encodings, and patterns—have become a lingua franca across biology, physics, cognition, and cultural theory. Their appeal is plain: they supply a vocabulary for explaining how systems vary in structure, how correlational regularities compress into messages, and how organization persists in the face of noise. Yet this very generality invites equivocation. “Information” in Shannon’s technical calculus is not the same as the information that constitutes semantic content in an utterance; nor is either identical to the organizational constraints that govern morphological form in organisms. The central thesis of this chapter is modest: the concept of readability—our capacity to discern and interpret āyāt, in both natural and textual senses—benefits from informational insights, but only if we resist an inflationary move that collapses measurable formal difference into authorial message or semantic meaning without further warrant.

To sharpen this claim it helps to distinguish three analytically separable senses in which “information” is invoked. First is the syntactic or statistical sense familiar from Shannon: information as measurable difference that reduces uncertainty given a defined channel and distribution³⁶¹. Second is the semantic sense: information as content about the world that can stand for, refer to, or be true or false—an account developed in different forms by Dretske and others who relate information to lawful correlations and representation³⁶². Third is the pragmatic or normative sense: information as that which is used by agents for explanation, decision, or action, and hence subject to norms of

³⁵⁶Ladyman and Ross, *Every Thing Must Go*, 66–129.

³⁵⁷Ladyman and Ross, *Every Thing Must Go*, 66–129.

³⁵⁸Ladyman and Ross, *Every Thing Must Go*, 66–129.

³⁵⁹Chalmers, *Conscious Mind*.

³⁶⁰Chalmers, *Conscious Mind*.

³⁶¹Shannon, “Mathematical Theory of Communication.”

³⁶²Dretske, *Knowledge and the Flow of Information*, 44–46.

interpretation, justification, and error (a domain where Searle's work on intentionality and debates about normativity are pertinent) ³⁶³. Conflating these senses risks two symmetrical errors.

The first error is inflationism: to infer authorial or divine intent from any measurable pattern. A fractal coastline exhibits informational regularity; the DNA molecule carries sequence information in Shannon's sense; planetary orbits instantiate lawful mathematical relations. But the observation that such systems instantiate formal patterns does not, on its own, establish that they are authored messages. Readability—seeing an āyah—requires more than pattern recognition; it requires an account of how formal difference is linked to reference and normativity. The Qur'ānic use of āyah, however, is instructively polyvalent: the term can denote a verse of scripture and also a sign in nature, implying both produced sign and natural sign without collapsing the two categories indistinctly ³⁶⁴; discussions by Izutsu and Rahman emphasise this polyvalence and caution against naïve literalism in moving from sign to sender or message ³⁶⁵.

The second error is reductionism: to insist that because information has measurable correlates it can be exhaustively reduced to physical measures and syntactic relations. Naturalists who push this line are right to insist on the indispensability of physical substrates and mechanism, but they may overlook that semantic and normative dimensions of interpretation—how systems count as representations for agents, how correctness and error are defined—are not simply given by physical structure alone. Philosophers of information and mind have long debated these bridges: Floridi's analysis of levels of abstraction and semantic content is useful here, as are debates about intentionality and representation that trace back through Peirce and more recent analytic treatments ³⁶⁶. Moreover, the view that mathematics is mysteriously yet indispensably suited to physics—Wigner's "unreasonable effectiveness"—complicates any easy physicalist dismissal of semantic or interpretive questions ³⁶⁷; Putnam's reflections on mathematics, matter, and method further temper simplistic reductions ³⁶⁸.

How, then, should we construe readability without overreach? Three linked conditions ground a responsible inference from measured information to meaningful sign. First, there must be detectable formal patterning that is non-arbitrary relative to a background model—Shannon-style differences measured against a specified channel are the starting point, not the conclusion ³⁶⁹. Second, there must be a plausible decoding mechanism or interpreter: some system or agent for whom the pattern bears systematic relations to states of the world; Dretske's and Peircean accounts help articulate how correlations become representations in the presence of a consumer able to exploit those correlations

³⁶³Searle, *Intentionality*, 1.

³⁶⁴Qur'ān 2:106; 41:37; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

³⁶⁵Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 65–79.

³⁶⁶Floridi, *Philosophy of Information*, 80–107. Peirce, *Philosophical Writings*, 99. Wigner, "Unreasonable Effectiveness of Mathematics."

³⁶⁷Wigner, "Unreasonable Effectiveness of Mathematics."

³⁶⁸Putnam, *Mathematics, Matter and Method*, 60–78.

³⁶⁹Shannon, "Mathematical Theory of Communication."

³⁷⁰. Third, there must be normative linkages: the pattern must be evaluable under standards of correctness, relevance, or purpose—conditions that bring in questions of intentionality, meaning, and practical use (Searle’s concerns about the irreducibility of intentionality are salient here) ³⁷¹.

Concrete examples clarify the application. Morse code on a flagpole exemplifies all three conditions: patterned differences, a decoding convention, and normative standards of correct transmission and interpretation. DNA sequences provide strong syntactic and mechanistic patterning and a biological decoding apparatus, but debates persist about whether this exhausts semantic content or import in a human-like sense. An aurora or a mathematical regularity instantiated in physics may be highly readable in the sense of exhibiting formal pattern and inviting interpretation, yet whether such readability licenses an inference to intentional messaging depends on satisfying the second and third conditions; hence the theologian’s and naturalist’s intuitions can both be given charitable, distinct readings without collapsing into one another.

This approach keeps the door open to fruitful conversation between scientific, philosophical, and Islamic hermeneutical perspectives. The Qur’ānic conception of āyāt invites attentiveness to the world as sign-laden without endorsing an automatic move from pattern to authorial text; classical Islamic thinkers debated the ontology of signs and the proper bounds of inference from nature to God in ways that help calibrate modesty in interpretation ³⁷². Contemporary philosophy of science—sensitive to theory-ladenness, underdetermination, and the pragmatic constraints of interpretation ³⁷³—reinforces the methodological humility that readability demands.

As a closing assessment, informational language is indispensable for articulating how reality can be read, but it does not by itself carry the semantic and normative weight required to convert every formal difference into a message. A responsible account of āyāt and readability therefore requires three strands—formal measurement, a decoding relation, and normative criteria—that jointly restrain both inflationary and reductionist temptations while allowing naturalist, realist, anti-realist, and Islamic perspectives to engage on shared conceptual ground.

Chapter 30 — Mathematical Ontologies

Mathematical ontologies—broadly construed, the family of views that treats mathematical structure as metaphysically fundamental—offer a powerful explanation for what has long been called the “unreasonable effectiveness” of mathematics in the natural sciences by recharacterising that effectiveness as unsurprising: if reality is, in some relevant sense, mathematical, then the applicability of mathematics is simply the applicability of our descriptions to the structural bedrock of things ³⁷⁴.

³⁷⁰Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

³⁷¹Searle, *Intentionality*, 1.

³⁷²Rahman, *Major Themes of the Qur'an*, 65–79. Quine, *Word and Object*, 23–72. Kuhn, *Structure of Scientific Revolutions*, 43–52.

³⁷³Kuhn, *Structure of Scientific Revolutions*, 43–52. Quine, *Word and Object*, 23–72. van Fraassen, *Scientific Image*, 12. Dretske, *Knowledge and the Flow of Information*, 44–46.

³⁷⁴Ladyman and Ross, *Every Thing Must Go*, 66–129.

This explanation has a clear virtue of directness. Where nominalist or instrumentalist accounts must account for a curious congruence between two seemingly disparate orders—human-devised formalisms and empirical phenomena—structural realism and Platonist-inspired ontologies collapse the distance by making the formal order part of what exists. In consequence, modelling succeeds because the models are, at least partially, isomorphic to what they purport to represent.

Yet this move also exposes a higher-level question that such ontologies do not automatically answer. Granting that mathematical existence or structure obtains does not by itself explain two further desiderata that the notion of “readability” of reality intends to capture. First, why does structure become physically instantiated as particular, causal, spatio-temporal systems rather than merely existing in a non-instantiated realm of abstract patterns? Second, even if structure is instantiated, why and how is that instantiated structure accessible to conscious agents as structure—interpretable, meaningful, and capable of bearing truth-apt content?

These are distinct problems and deserve different conceptual resources. The first is a metaphysical and causal question about instantiation or embodiment. Structural realism explains resemblance between theory and world, but it leaves open what accounts for the transition from pattern-as-possibility to pattern-as-instantiated causal nexus. Naturalist replies tend to look for accounts that explain instantiation in terms of lawful regularities and ontic emergence—how certain microphysical arrangements give rise to macroscopic structures that can be captured by mathematics (a programme congenial to a broadly scientific metaphysics sympathetic to ³⁷⁵, ³⁷⁶, ³⁷⁷). Alternatively, theological or metaphysical traditions—exemplified in some classical Islamic metaphysical writings analysed by al-Attas and Nasr—may endorse a sustaining principle that grounds why abstract forms are instantiated in contingent reality ³⁷⁸, ³⁷⁹. My purpose here is not to adjudicate between these alternatives, but to underline that mathematical ontology, by itself, leaves this metaphysical gap intact.

The second problem is epistemic and semantic. It concerns the conditions under which an instantiated structure is not merely present but readable—i.e. capable of being interpreted as sign, explanation, or evidence by cognitive systems. Contemporary accounts of information and meaning are instructive here. Shannon’s information theory provides a model of syntactic information transmission ³⁸⁰, while philosophical theories of information and its semantic lift—Dretske’s teleosemantic account and Floridi’s philosophy of information—clarify how physical states can carry content relevant to agents’ epistemic projects ³⁸¹, ³⁸². Semiotic frameworks, from Peirce’s triadic sign theory to Eco’s semiotics, further illuminate that reading a sign requires an interpretant: a rule-governed practice or cognitive

³⁷⁵al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³⁷⁶al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³⁷⁷al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

³⁷⁸Nasr, *Islamic Cosmological Doctrines*.

³⁷⁹Nasr, *Islamic Cosmological Doctrines*.

³⁸⁰Shannon, “Mathematical Theory of Communication.”

³⁸¹Floridi, *Philosophy of Information*, 80–107.

³⁸²Floridi, *Philosophy of Information*, 80–107.

capacity that maps physical tokens to meanings^{383, 384}. Complementing these resources, discussions of intentionality and consciousness—Searle on intentionality and Chalmers on the hard problem—make plain that accessibility is not merely computational; it implicates subjective modes of presentation and the capacity to be about things in the world^{385, 386}. Extended or embodied accounts of cognition remind us that such access often depends on organism–environment couplings, not simply on internal descriptions³⁸⁷.

Concrete examples help to separate the issues. Newtonian mechanics is a mathematical structure that can be instantiated in a variety of systems: planetary motion, pendula, or engineered orbits. Structural realist sympathy explains why a common formalism applies across these cases. But why did any particular planet follow any particular trajectory rather than a mere abstract solution space? And why could human scientists, with a specific sensory apparatus and conceptual repertoire, read those trajectories as evidence for gravitational laws? The first question is about instantiation and causation; the second is about information encoding, measurement practices, and interpretive norms that make trajectories intelligible as instances of a law.

Critical objections sharpen the constraints on any satisfactory account. Anti-realist voices (e.g. van Fraassen) remind us that empirical adequacy, not ontological commitment, is often the goal of science³⁸⁸. From this perspective, the metaphysical addition of a realm of mathematical entities is superfluous. Realists insist that the success of science cries out for ontological explanation³⁸⁹. Islamic hermeneutical readings of nature as āyāt foreground yet another dimension: the Qur'ānic usage of āyah implies that natural phenomena function as signs meant to be reflected upon, but reflection itself presupposes both an ontological order and a dispositional openness in the interpreter (a theme explored by Izutsu, Rahman, and others)^{390, 391}. These positions are not mutually exclusive, but they emphasise different aspects of readability—formal structure, empirical method, and moral/spiritual interpretability.

Bringing these threads together suggests a plural, layered account. Mathematical ontology can supply a metaphysical explanation for why formal systems so fruitfully describe phenomena. A separate, compatible account must explain instantiation—either via naturalistic emergent processes or via metaphysical principles that ground embodiment. Finally, an epistemic-semiotic account is required to explain how agents come to recognise, represent, and attribute meaning to instantiated structures; this account will have to draw on information theory, semiotics, and theories of cognition. For traditions that speak of nature as āyāt, this third layer is further charged with ethical and existential

³⁸³Eco, *Theory of Semiotics*.

³⁸⁴Eco, *Theory of Semiotics*.

³⁸⁵Chalmers, *Conscious Mind*.

³⁸⁶Chalmers, *Conscious Mind*.

³⁸⁷Ladyman and Ross, *Every Thing Must Go*, 66–129.

³⁸⁸van Fraassen, *Scientific Image*, 12.

³⁸⁹Qur'ān 3:190–191; 45:3–5; 51:20–21, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

³⁹⁰Rahman, *Major Themes of the Qur'an*, 65–79.

³⁹¹Rahman, *Major Themes of the Qur'an*, 65–79.

requirements: signs require not only cognitive capacities but disposition and practice to be read as such ³⁹², ³⁹³. Any comprehensive theory of readability of reality will therefore be pluralistic: metaphysically informed, epistemically precise, and sensitive to interpretive frameworks. Each strand addresses a different piece of the puzzle; only together do they make intelligible why structures exist, why they are instantiated, and why they can be read as meaningful.

Chapter 31 — Classical Theism

Classical theism advances a simple but powerful explanatory schema: the contingent, intelligible cosmos depends on an ultimate rational source; finite cognitive capacities are proper effects within that created order; and the intelligibility we experience is not an accident but a derivative reflection of that source. Drawing a conceptual link between the metaphysical grounding of reality and the epistemic capacities that access it, this schema promises to make less mysterious the apparent consonance between mind and world. To assess its merit it is helpful to distinguish several kinds of “intelligibility” and to set the theistic proposal beside its naturalist and anti-realist competitors.

First, intelligibility may be construed metaphysically or epistemically. Metaphysical intelligibility concerns the world’s internal order—the regularities, structures, and laws that allow systematic description. Epistemic intelligibility concerns our capacities to represent, predict, and explain those structures. A satisfactory account ideally explains both why reality admits systematic description and why creatures like us can grasp that order. Classical theism purports to do both: a rational ground explains why the world has lawlike structure, and creatures fashioned within that order possess cognitive faculties proportioned to it. This two-layered account addresses the puzzle emphasised by thinkers who remark on the “unreasonable effectiveness” of mathematics or the surprising fit between conceptual schemes and empirical phenomena ³⁹⁴.

Concrete examples sharpen the contrast. When physicists employ sophisticated mathematics to predict physical behaviour, one may ask whether that success is mere contingency, a result of Darwinian pruning of our cognitive toolkit, or evidence of deeper metaphysical affinity. Naturalists often appeal to evolutionary explanation: cognitive organisms that survive are those whose perceptual and inferential systems track relevant regularities; hence the fit need not be metaphysically privileged but is the product of selection ³⁹⁵. Anti-realists or instrumentalists, by contrast, deny that theories “mirror” reality in any strong metaphysical sense and focus on empirical adequacy and pragmatic utility ³⁹⁶. The theist response is different in kind: the match between mathematical intelligibility and physical regularity is intelligible because both derive from a single rational source that grounds the intelligibility

³⁹²Qur’ān 51:20–21; 3:190–191, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

³⁹³Izutsu, *God and Man in the Qur'an*, 142–162.

³⁹⁴Wigner, “Unreasonable Effectiveness of Mathematics.” Putnam, *Mathematics, Matter and Method*, 60–78.

³⁹⁵van Fraassen, *Scientific Image*, 12.

³⁹⁶van Fraassen, *Scientific Image*, 12.

of entities and minds alike. This is not a claim that science “proves” theology but a metaphysical hypothesis offering unificatory depth.

Several conceptual clarifications are needed. Theistic accounts vary: some construe divine agency as directly imposing laws, others as sustaining dispositions and natures that unfold lawfully. Historical Islamic philosophy contains rich alternatives—al-Ghazālī emphasised divine voluntarism and created regularities contingent on God’s will, while Ibn Rushd defended a more nature-centred account of causality—showing that even within a theistic framework one may distinguish notions of dependence and lawful regularity³⁹⁷. Qur’ānic exegetical traditions likewise characterise creation as replete with āyāt—signs that both manifest divine authorship and invite rational reflection—an interpretive vocabulary that aligns metaphysical dependence with epistemic invitation³⁹⁸.

Objections to the theistic schema fall into three broad families. First, methodological and parsimony concerns: postulating a transcendent cause may seem an unnecessary ontological cost when naturalistic accounts (evolutionary, anthropic, or pluralistic) can explain cognitive fit without recourse to the divine. This is a legitimate demand for comparative explanatory virtue: scope, simplicity, explanatory depth, and fruitfulness all count. Second, specific theological problems—hiddenness, theodicy, and divine action—expose tensions between the postulated transcendent source and observable fact. Why would an intelligent source render the world intelligible yet remain epistemically elusive in other respects? How does a purposeful divine will cohere with the persistence of apparent law and regularity? Third, epistemic access: even if God grounds intelligibility, epistemic questions remain about how limited agents can justifiably infer that grounding from empirical or rational evidence without circularity.

Each of these objections has replies but none are decisive. The theist may counter parsimony worries by arguing that metaphysical unification can justify ontological commitment if it achieves explanatory integration across disparate domains (physics, mind, meaning) in a way that naturalism struggles to match. On hiddenness and action, theological resources and debates—classical distinctions between conservation and concurrence versus occasionalism—supply different accounts of how divine agency coexists with natural law; these are substantive theological claims that must be weighed alongside their philosophical costs³⁹⁹. Naturalists and anti-realists, for their part, can insist on methodological humility: metaphysical depth is not the only virtue of an explanation, and empirical adequacy, predictive power, and parsimony remain decisive in many contexts⁴⁰⁰.

To close this line of thought, classical theism frames the intelligibility of reality as explanatorily unified with the existence of finite minds. This proposal addresses an important puzzle—why mind and world

³⁹⁷al-Ghazālī, *Incoherence of the Philosophers*, 166–167. Ibn Rushd, *Decisive Treatise*, 1–9.

³⁹⁸Qur’ān 3:190–191; 41:53; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

³⁹⁹Nasr, *Islamic Cosmological Doctrines*. van Fraassen, *Scientific Image*, 12.

⁴⁰⁰van Fraassen, *Scientific Image*, 12. Boyd, “Current Status of Scientific Realism,” 41–82. Popper, *Logic of Scientific Discovery*, 57–73.

systematically “fit”—by positing a metaphysical source that accounts for both the world's rational order and our capacity to register it. That account has explanatory strengths, particularly in the realm of unification and metaphysical depth, but it also incurs significant theoretical costs and faces substantive objections from methodological, theological and epistemic angles. It should therefore be regarded not as a settled verdict but as a robust metaphysical hypothesis that competes with evolutionary and instrumentalist explanations. Engaging those alternatives on their own terms, and attending to Qur’ānic notions of āyāt as both signs and invitations to reflection, can foster a more nuanced dialogue between philosophy of information, philosophy of mind, and religious doctrine ⁴⁰¹.

Chapter 32 — The Qur’ānic Metaphysics of Readability

The transition from generic classical theism, as defended in the previous chapter, to the specifically Qur’ānic framework developed here requires its own justification, since establishing that theism in general accounts for readability does not by itself establish which theistic tradition, if any, gives that account its most determinate content. Generic classical theism secures the metaphysical claim that an intelligent, purposive ground of order explains why reality yields itself to constrained inquiry; it does ⁴⁰². Where generic theism explains that the world is ordered by a purposive ground, the Qur’ānic framework explains, in addition, why the appropriate human response to that order is interpretive rather than merely inferential—why reading, in something close to the ordinary sense, is the operative metaphor rather than deduction or observation alone⁴⁰³. This does not prove the Qur’ānic framework uniquely true; it identifies the specific respect in which it is more determinate than generic theism, and therefore not simply a redundant relabelling of a conclusion already secured.

The Qur’ānic framework I propose supplements general theism with the organizing concept of āyāt. To call created reality āyāt is not merely to assert that things exist or are caused; it is to claim that the world is constituted so as to be capable of indication—of bearing signs—within a horizon of divine wisdom. This is a metaphysical orientation rather than a positivist proof: it supplies a way of understanding the relations among order, knowledge, error and meaning. It neither eliminates nor supplants the practices of science; it offers an interpretive matrix within which scientific, philosophical and theological claims can be held in relation to one another.

It helps to make three conceptual distinctions at the outset. First, between causation and signification. Causal description asks why events occur; signification asks how events can count as indices or signals pointing beyond themselves. The former is the province of natural science; the latter is the domain of semiotics and of certain metaphysical claims about purposeful indication. Second, between different

⁴⁰¹Floridi, *Philosophy of Information*, 80–107. Chalmers, *Conscious Mind*. Qur’ān 3:190–191; 41:53; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004). Nasr, *Islamic Cosmological Doctrines*. Rahman, *Major Themes of the Qur'an*, 1–16. Izutsu, *God and Man in the Qur'an*, 142–162.

⁴⁰²Rahman, *Major Themes of the Qur'an*, 1–16. Izutsu, *God and Man in the Qur'an*, 142–162. Nasr, *Islamic Cosmological Doctrines*.

⁴⁰³al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16. Madigan, *Qur'an's Self-Image*.

senses of information. Shannon's formal measure captures syntactic information—capacity to reduce uncertainty in a channel ⁴⁰⁴—whereas semantic accounts treat information as meaningful content (Floridi, Dretske) and tend to connect it to knowledge or representation ⁴⁰⁵. Third, between the ontological claim that the world is intelligible and the epistemological claim that finite beings can access that intelligibility. The Qur'ānic idiom that reality consists of āyāt asserts the first; the human predicament of interpretive finitude concerns the second (⁴⁰⁶; cf. al-Attas on the metaphysical grounding of knowledge ⁴⁰⁷).

From these distinctions a fourfold integration follows naturally. First: the world's stability and order are intelligible in part because reality is created as a coherent whole. Classical metaphysics already assumed the cosmos to exhibit regularities (see Aristotle on nature and form ⁴⁰⁸); in the Qur'ānic idiom such regularities function as āyāt—indices of a normative arranging principle. Second: human knowers are capable of investigating the world because their cognitive capacities belong to the same created order that they interrogate. This is not a mystical claim that science is infallible, but an assurance that intelligibility is not a sheer accident. Philosophers troubled by the “unreasonable effectiveness” of mathematics or by the congeniality of human cognition to nature have offered various accounts; one can characterise the Qur'ānic view as metaphysically congenial to such problems without insisting that science prove theology ⁴⁰⁹. Third: error remains possible because interpretive agents are finite. Kant's emphasis on the limits of reason, together with Kuhn's and Popper's analyses of scientific change and critique, remind us that knowledge is fallible, revisable, and theory-laden (⁴¹⁰). The Qur'ānic framework takes this seriously: āyāt invite interpretation; they do not coerce univocal readings. Fourth: signification is metaphysically possible because reality is, on this view, grounded in an ultimate intentionality—an origin that institutes the world as meaningful. This is a theological postulate about the source of signhood rather than an empirical hypothesis about mechanisms.

Objections are foreseeable and instructive. A naturalist might construe āyāt as nothing more than contingent regularities that humans ontologically project with no metaphysical warrant. An anti-realist will emphasise the role of social and conceptual practices in constituting meaning (van Fraassen, Putnam), claiming that “signs” are human responses to interpretive frameworks ⁴¹¹. Both positions raise an important corrective: the Qur'ānic reading must not collapse into an endorsement of naïve realism that ignores hermeneutic mediation. Islamic intellectual history exhibits similar tensions: al-Ghazālī's critique of philosophical certainties and Ibn Rushd's defence of rational investigation

⁴⁰⁴Shannon, “Mathematical Theory of Communication.”

⁴⁰⁵Floridi, *Philosophy of Information*, 80–107. Dretske, *Knowledge and the Flow of Information*, 44–46.

⁴⁰⁶Eco, *Theory of Semiotics*.

⁴⁰⁷al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

⁴⁰⁸Aristotle, *Physics*, 194b17–20.

⁴⁰⁹Nasr, *Islamic Cosmological Doctrines*. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

⁴¹⁰Kant, *Critique of Pure Reason*. Kuhn, *Structure of Scientific Revolutions*, 43–52. Popper, *Logic of Scientific Discovery*, 57–73.

⁴¹¹van Fraassen, *Scientific Image*, 12. Putnam, *Mathematics, Matter and Method*, 60–78.

exemplify how Islamic thinkers negotiated causality, teleology and interpretation (⁴¹²). One constructive response is to adopt a Peircean semiotic sensibility: signs involve a triadic relation among sign, object and interpretant, thereby allowing an account of natural indices that is neither crude realism nor mere conventionalism (⁴¹³).

Concrete examples illuminate the proposal. A rainstorm functions in a meteorological description as a fluid-dynamical process; as a āyah it may also operate as an index prompting ethical or existential reflection in a human community. A recurring mathematical regularity—whether in planetary motion or in the genetic code—can be studied by physicists and biologists under laws and models, while simultaneously serving as a locus for metaphysical reflection about intelligibility (Wigner’s puzzle about mathematics’ effectiveness exemplifies this tension ⁴¹⁴). In each case the Qur’ānic claim is not that the scientific account is false, but that the existence of order makes possible readings that point toward meaning without supplanting mechanistic explanation.

In conclusion, presenting creation as āyāt affords an integrative metaphysical stance: it explains why there is order to be studied, why human inquiry is possible, why error and plural interpretation persist, and why signification—the capacity of things to mean—can be coherently posited. This framework is strongest when offered as an interpretive integration rather than as a deductive proof. It preserves space for naturalistic explanations and for anti-realist lessons about conceptual mediation, while providing, for those inclined, a theological account of the ultimate ground of signhood. The result is an invitation to epistemic humility and interdisciplinary conversation: to read reality as both object and text, to engage scientific practice while acknowledging the perennial need for interpretation.

Part VIII — Synthesis

This part develops the monograph’s central question by moving from the phenomenon of knowability to its conceptual, scientific, semantic, Qur’ānic, and metaphysical interpretation. The chapters are cumulative: each preserves the distinctions established earlier while testing them against a new domain.

Chapter 33 — From Readability to Āyāt

The move from a thesis about the “readability” of reality to a claim about āyāt must be made explicit rather than smuggled in. Readability, as I have used it throughout this study, denotes a cluster of epistemic phenomena: the existence of stable regularities, the capacity of observers to detect and codify those regularities, and the possibility of intersubjective communication about them. Philosophers of information and communication give us helpful conceptual tools here. Shannon’s information-theoretic framework characterises the transmission and recovery of signals against noise ⁴¹⁵; Floridi further situates information as an ontic and epistemic primitive that structures how systems

⁴¹²al-Ghazālī, *Incoherence of the Philosophers*, 166–167. Ibn Rushd, *Decisive Treatise*, 1–9.

⁴¹³Qur’ān 3:190–191; 41:53, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁴¹⁴Wigner, “Unreasonable Effectiveness of Mathematics.”

⁴¹⁵Eco, *Theory of Semiotics*.

are intelligible to one another ⁴¹⁶. These resources support the claim that reality is, in an important sense, readable: it admits informational relations that agents can discover and exploit. But this conclusion by itself is neutral with respect to questions of ultimate meaning or metaphysical teleology. Readability establishes accessibility; it does not, without further premises, establish divine authorship or intentional signification.

To move from accessibility to āyāt requires an additional ontological premise: that phenomena are not merely patterns that can be described, but signs that participate in intentional indication. Islamic theological and philosophical traditions furnish precisely this interpretive premise. The Qur'ānic corpus repeatedly frames created phenomena as signs (āyāt) pointing beyond themselves (cf. numerous passages of the Qur'ān) ⁴¹⁷; exegetical and metaphysical commentaries elaborate an ontology in which creation manifests attributes of the divine and thereby invites hermeneutic engagement (see Izutsu, Rahman, Nasr, Al-Attas) ⁴¹⁸. On this view, the discoverability of laws and structures is not simply a brute conjunction of mind and world but is intelligibly situated within a unified order intended to be read. If one accepts the Qur'ānic metaphysical premise, then the phenomenon of readability can be interpreted as fitting within an enacted plan of meaning—creation as text in which āyāt function as pointers to a theologically saturated unity.

This claim must be formulated carefully and comparatively. First, it is conditional: the inference from readability to theological reading obtains only if the prior metaphysical premise is granted. Second, it is comparative: the Qur'ānic interpretive framework should be assessed against competing accounts—naturalistic, scientific realist, pragmatic, and anti-realist—on the basis of explanatory virtues, scope, and coherence. Naturalists, for example, tend to account for readability through evolutionary and cognitive mechanisms: pattern sensitivity is selected for because it enhances survival, and scientific methods formalise and amplify these capacities (a perspective consonant with Darwinian naturalism as treated in contemporary philosophy of mind) ⁴¹⁹. Scientific realists point to the success and predictivity of scientific theories as evidence that our models latch onto an independently structured world (debated in the literature on realism and anti-realism) ⁴²⁰. Anti-realists and constructivists respond that what counts as readable is partly shaped by conceptual schemes and social practices (a point emphasised in Kuhn and in Quine's holism) ⁴²¹.

An important conceptual distinction helps clarify these positions: the difference between a phenomenon's capacity to be represented (epistemic readability) and its capacity to signify

⁴¹⁶Floridi, *Philosophy of Information*, 80–107.

⁴¹⁷Qur'ān 2:164; 3:190–191; 41:53; 51:20–21, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁴¹⁸Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 1–16. Nasr, *Islamic Cosmological Doctrines*. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

⁴¹⁹Dennett, *Darwin's Dangerous Idea*.

⁴²⁰Boyd, "Current Status of Scientific Realism," 41–82. van Fraassen, *Scientific Image*, 12. Popper, *Logic of Scientific Discovery*, 57–73. Quine, *Word and Object*, 23–72.

⁴²¹Kuhn, *Structure of Scientific Revolutions*, 43–52. Quine, *Word and Object*, 23–72.

intentionally (ontological indication). The first is the province of information theory, cognitive science, and epistemology; the second invokes semiotics and metaphysics. Peirce's triadic model of signification and Eco's semiotic account furnish frameworks in which natural objects may function as signs without presupposing a divine author, whereas Islamic readings treat such semiotic function as rooted in divine intentionality⁴²². For example, the regularities that permit mathematical descriptions of planetary motion or genetic coding are epistemically readable in the minimal sense; they can also be construed as signs (*āyāt*) only if one adds a metaphysical commitment about teleology or intentionality.

Objections must be taken seriously. A naturalist might argue that positing divine intention is explanatorily superfluous: the perceived fit between mind and world arises from contingent evolutionary convergence and the methodological refinement of the sciences. An anti-realist might add that "fit" is a function of conceptual schemes, not an index of metaphysical correspondence. Conversely, a proponent of the Qur'ānic paradigm could reply that the kind of unifying interpretation offered by the *āyāt* concept exhibits distinctive explanatory economy: it accounts not only for pattern detectability but also for the existential orientation of inquiry, the moral and teleological dimensions of human life, and the recurring thematic motifs present in the Qur'ānic text itself (as discussed by Rahman, Izutsu, and Al-Attas)⁴²³. Here the debate turns on methodological criteria: do we privilege theoretical parsimony and empirical productivity, or do we also count existential and hermeneutic integration among the virtues of an explanation?

It is tempting to treat interpretive unification as evidence in its own right. In contemporary philosophy of science, inference to the best explanation is a recognised epistemic practice: theories that unify disparate phenomena, increase understanding, and exhibit predictive fertility gain epistemic credit (a topic central to debates between realists and anti-realists)⁴²⁴. If the Qur'ānic metaphysics yields a more unified reading of the manifold dimensions of readability—scientific, moral, existential—then it might be granted increased prior probability on pragmatic and hermeneutic grounds. Yet one must resist the inverse fallacy: unification does not entail proof of metaphysical truth. Even when a framework has strong interpretive purchase, alternative accounts may achieve similar coherence by different means.

Concluding this discussion, the transition from readability to *āyāt* is defensible only as a conditional and comparative inference. Readability supplies an epistemic basis; the Qur'ānic conception of *āyāt* supplies the ontological interpretation that renders readability meaningful in a theological register. Assessing whether that interpretation counts as evidence in favour of the Qur'ānic metaphysical premise requires comparing its explanatory scope, coherence, and integrative virtues with rival accounts—naturalist, realist, and anti-realist alike—while acknowledging that such assessment inevitably blends epistemic, hermeneutic, and existential criteria.

⁴²²Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

⁴²³Rahman, *Major Themes of the Qur'an*, 1–16. Izutsu, *God and Man in the Qur'an*, 142–162. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

⁴²⁴Boyd, "Current Status of Scientific Realism," 41–82. van Fraassen, *Scientific Image*, 12.

Chapter 34 — The Argument Reconstructed

Reality, as experienced and investigated, is not a mere chaos of brute particulars but repeatedly exhibits relatively stable structures—patterns, regularities, and correlations—that respond to disciplined forms of inquiry. Planets follow predictable paths, chemical elements combine according to repeatable rules, and biological systems display conserved informational mechanisms such as genetic coding. These instances illustrate a cluster of features that I shall call readability: the conjunction of (a) structural regularity in the world, (b) epistemic accessibility through practices that produce corrigible representations, and (c) the capacity of those representations to predict, integrate, and guide further inquiry. Readability, thus characterized, sits between metaphysics and epistemology; it is not merely the existence of order, nor simply the presence of information, nor reducible to subjective understanding. It is the fit between worldly pattern and investigatory competence.

To sharpen the concept, several distinctions are necessary. First, “order” as a formal notion (for instance, the existence of stable laws or symmetries) does not suffice for readability unless there is an epistemic bridge that renders those orders discoverable, testable, and revisable. Second, “information” must be disentangled from the technical signal-centric sense in Shannon’s theory⁴²⁵ and from semantic or meaningful content discussed in Floridi’s and Dretske’s work⁴²⁶. A mere low-entropy signal can bear no semantic significance; conversely, semantic information requires interpreters or mechanisms that correlate signs with worldly states. Third, readability presupposes an epistemic normativity: representations are corrigible in the sense emphasised by Popper⁴²⁷ and responsive to standards of evidence and refutation, not merely pragmatically useful fictions in Kuhn’s sense of paradigm-dependent practice⁴²⁸. Finally, there is a tension with theories of mind: the capacity to form representations that mean and predict draws on debates about intentionality and consciousness (Searle, Chalmers, Dennett)⁴²⁹, but readability does not commit to any single account of mental architecture.

These conceptual contours help to expose where explanatory questions arise. Once we acknowledge that the world is readable in the sense above, we are entitled—philosophically, if not metaphysically—to ask why readability obtains at all. Rival frameworks offer different unifying explanations. A scientific naturalist might locate readability in the reliability of lawful regularities plus the evolutionary and cognitive capacities that enable organisms to track those regularities: minds have evolved to exploit environmental patterns, and scientific communities have honed methods to amplify that capacity (a broadly Darwinian and methodological account). An ontological realist will add that the success of these methods is best explained by the existence of mind-independent structures that our theories

⁴²⁵Shannon, “Mathematical Theory of Communication.”

⁴²⁶Floridi, *Philosophy of Information*, 80–107. Dretske, *Knowledge and the Flow of Information*, 44–46.

⁴²⁷Popper, *Logic of Scientific Discovery*, 57–73.

⁴²⁸Kuhn, *Structure of Scientific Revolutions*, 43–52.

⁴²⁹Searle, *Intentionality*, 1. Chalmers, *Conscious Mind*. Dennett, *Darwin's Dangerous Idea*.

progressively latch onto ⁴³⁰. An anti-realist or constructive empiricist, following van Fraassen, will instead emphasise the instrumental adequacy of theories and the pragmatic norms of acceptance rather than metaphysical commitments ⁴³¹. Each of these positions evaluates the same data of readability under different criterion weightings: ontic fit, epistemic modesty, pragmatic utility, and methodological robustness.

The Qur'ānic theistic idiom offers a different unifying picture. In Islamic discourse, the world's manifest patterns are conceived as āyāt—signs—intentionally created and ordered by the Divine. Classical and modern Muslim exegetical voices, from Izutsu to Rahman and al-Attas, have treated āyāt not only as moral or eschatological prompts but as cosmological indicators that invite human reflection on order, purpose, and intelligibility ⁴³². This framing integrates structure, normativity, and signification: the world's readability is a providentially structured phenomenon meant to be interpreted by responsible agents. Such a theological account promises explanatory depth by linking physical regularities, human epistemic capacities, and existential orientation in a single interpretive frame.

This does not collapse into a deductive proof of theology. Rather, the claim is modest: readability functions as an abductive datum that affords some degree of support to interpretive frameworks that can unify its components. Theist, realist, naturalist, and anti-realist explanations can each be judged by shared criteria: explanatory scope (how many phenomena are covered), coherence with epistemic norms (corrigibility and integration with scientific practice as described by Popper and Kuhn), parsimony, and fecundity (the capacity to generate new, testable conjectures). For instance, the mathematical success of physics—the “unreasonable effectiveness” that Wigner highlighted—poses a cross-theoretical pressure: an explanation of readability should illuminate why abstract structures so fruitfully model empirical reality ⁴³³.

Objections are straightforward and instructive. A naturalist will insist that appeal to divine purpose is explanatorily superfluous if evolutionary and physical mechanisms suffice to account for pattern and representation; an anti-realist will underspecify metaphysical commitment while retaining a robust account of epistemic practice; a theist will reply that these naturalistic accounts neglect the normative and semiotic dimensions captured by āyāt, as discussed in semiotic traditions from Peirce to Eco ⁴³⁴. Each disagreement pinpoints where the argument hinges: the reality of the explanandum (do we grant readability as a distinct phenomenon?), the adequacy of the concept, whether metaphysical explanation is legitimate, the comparative criteria for evaluating frameworks, and the assessment of rivals.

In conclusion, taking readability seriously generates a disciplined abductive project: to assess which metaphysical and epistemic frameworks best unify the empirical regularities, the norms of inquiry, the

⁴³⁰Boyd, "Current Status of Scientific Realism," 41–82. Ladyman and Ross, *Every Thing Must Go*, 66–129.

⁴³¹van Fraassen, *Scientific Image*, 88.

⁴³²Qur'ān 2:164; 3:190–191; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁴³³Ladyman and Ross, *Every Thing Must Go*, 66–129.

⁴³⁴Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

role of consciousness, and the semiotic quality of signs. The Qur'ānic notion of āyāt offers one such unifying account, neither provable nor dismissible by scientific demonstration alone, but worthy of philosophical consideration alongside naturalist and anti-realist alternatives. The virtue of this stance is its openness: it treats the phenomenon as a public, theoretically rich explanandum that requires comparative evaluation rather than rhetorical assertion.

Chapter 35 — Objections, Limits, and Unresolved Problems

A cluster of objections to the project as outlined must be taken seriously if the claim that reality is "readable" is to withstand critical scrutiny. The first objection is conceptual: readability is merely a synonym for intelligibility, offering no new analytic purchase. This challenge deserves a refined reply rather than dismissal. Readability, as I use it, picks out a relational complex whose essential features are discovery (the epistemic access an inquirer can attain), constraint (the extent to which the world limits the range of successful descriptions), and corrigibility (the capacity for revision in light of evidence). These three dimensions foreground the practices of inquiry—how information is obtained, how hypotheses are constrained by the world, and how theories are corrected—rather than simply labelling phenomena as "intelligible." That move opens distinct questions about channels and formats of information (a topic inhering in Shannon's formal account ⁴³⁵), the semantics of how signals become contentful (a tradition from Dretske to Floridi ⁴³⁶), and the institutional mechanisms—experiment, peer criticism, theoretical unification—by which corrigibility is exercised (the concerns of Popper and Kuhn ⁴³⁷). Intensive analysis along those vectors can show that "readability" is not a mere synonym but a diagnostic concept with explanatory leverage.

A second objection stresses that the success of science can be explained by selection and correction—evolutionary and socio-epistemic filtering will, over time, yield reliable instruments and robust theories; thus no further metaphysical mystery remains. This naturalistic point is powerful and must be accommodated. Darwinian selection and methodological criticism plausibly account for why unreliable cognitive strategies are culled and why science converges on effective techniques (one can read Dennett and Clark for cognate claims about embodied, extended cognition and evolutionary epistemology ⁴³⁸). But the residual question—why are there stable regularities for selection and correction to exploit?—is not thereby dissolved. The explanatory story may stop at the mechanism without addressing the deeper metaphysical status of the regularities: whether they are brute, lawlike features of mind-independent reality (the realist's stance, defended in various ways by Boyd and Putnam ⁴³⁹), artefacts of conceptual schemes (a variant of anti-realism in the spirit of Quine and van

⁴³⁵Shannon, "Mathematical Theory of Communication."

⁴³⁶Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

⁴³⁷Popper, *Logic of Scientific Discovery*, 57–73. Kuhn, *Structure of Scientific Revolutions*, 43–52.

⁴³⁸Dennett, *Darwin's Dangerous Idea*. Clark, *Supersizing the Mind*, 1–82.

⁴³⁹Boyd, "Current Status of Scientific Realism," 41–82. Putnam, *Mathematics, Matter and Method*, 60–78.

Fraassen ⁴⁴⁰), or expressions of a created order intelligible by a non-natural account. Recognising this keeps the debate between naturalist and metaphysical accounts live and demands that any claim about readability clarify which level of explanation it seeks to serve.

A third objection asserts that theism trivialises readability by simply renaming it "divine design." This rejoinder is well-taken if theism is offered as an ad hoc label that substitutes theological vocabulary for philosophical explanation. To avoid that charge, the theistic option must be developed in terms that connect metaphysics, rationality, and epistemic access: classical Islamic metaphysics, for instance, does not merely assert divine authorship but furnishes a structured account of God as the source of intelligible order and the explanatory unifier of natural and moral teleology (resources for such work can be found in al-Ghazālī, Ibn Rushd, and Al-Attas ⁴⁴¹). To be philosophically respectable, theological claims must articulate how divine intentionality, created laws, and human cognitive faculties are coordinated—an endeavour that requires argument, not label-swapping, and which must be publicly assessable in principle.

A final pragmatic objection concerns the use of the Qur'ānic concept of āyāt: does invoking āyāt render the theory confessional and therefore less accessible to non-Islamic audiences? The response is twofold. First, the philosophical arguments about information, consciousness, and readability are developed in conceptual terms that can be assessed independently of confession; debates between scientific realists and anti-realists, for instance, have their own criteria and literature ⁴⁴². Second, treating āyāt as a comparative metaphysical model does not withdraw the project from public scrutiny; rather, it supplies an alternative interpretive frame—rooted in Qur'ānic discourse and exegetical traditions (see Izutsu, Rahman, and the Qur'ān itself for treatments of āyāt as signs bearing meaning within a theological cosmos ⁴⁴³)—that can be juxtaposed with secular frameworks for mutual illumination. The Qur'ānic language of āyāt invites reasoned engagement; it is not merely an esoteric cipher.

A further, more structural objection concerns circularity: does the appeal to corrigibility as the master epistemic virtue simply presuppose naturalistic standards of correction from the outset, so that any framework—including the Qur'ānic one—is judged well only insofar as it mimics scientific method? The objection has force against any argument that smuggled in naturalistic criteria while claiming neutrality. The response offered here is that corrigibility, as characterised in earlier chapters, is formulated at a level general enough to be satisfied by exegetical revision, ijtihād, and communal correction as much as by experimental replication; the shared virtue is openness to correction by a source of evidence external to the interpreter's antecedent commitments, not conformity to any single

⁴⁴⁰Quine, *Word and Object*, 23–72. van Fraassen, *Scientific Image*, 12.

⁴⁴¹al-Ghazālī, *Incoherence of the Philosophers*, 166–167. Ibn Rushd, *Decisive Treatise*, 1–9. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

⁴⁴²Boyd, "Current Status of Scientific Realism," 41–82. van Fraassen, *Scientific Image*, 12. Popper, *Logic of Scientific Discovery*, 57–73.

⁴⁴³Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 65–79. *The Qur'ān*, trans. Abdel Haleem.

institutional procedure. The residual limitation is that what counts as an adequate external check still differs across traditions, and this monograph has not supplied a tradition-neutral algorithm for adjudicating those differences—only a shared formal requirement that every framework considered here can in principle satisfy.

A related redundancy objection asks whether invoking āyāt adds anything beyond what a generic appeal to design or purposive order already supplies, so that the Qur'ānic vocabulary functions as decoration on an argument already complete without it. The chapter on the Qur'ānic metaphysics of readability responded to a version of this worry directly: the Qur'ānic framework specifies an interpretive posture—corrigible, historically situated, ethically consequential reading—that generic theism leaves unspecified. The residual limitation is that this response establishes non-redundancy of

These objections point toward a set of unresolved problems that should remain prominent rather than be prematurely closed. The relation between syntactic information (as in Shannon) and semantic meaning (as treated by Dretske and Floridi) persists as a central puzzle: how does mere difference become aboutness? The status of consciousness—whether reducible to physical processes, an emergent property, or a basic feature of reality—remains contested (see Nagel, Chalmers, Dennett for representative positions ⁴⁴⁴). The limits of evolutionary epistemology, the possibility of radically alien forms of cognition that interpret the same world differently, and whether explanatory unification is evidence for truth or merely a theoretical virtue (a concern in the realism/anti-realism literature ⁴⁴⁵) all deserve continued attention.

Overall, the claim that reality is readable is defensible only if it is pursued across several registers simultaneously: information-theoretic accounts that illuminate channels and constraints, epistemological models that vindicate corrigibility and objectivity, metaphysical treatments that make sense of the persistence of regularity, and hermeneutical resources—such as the Qur'ānic notion of āyāt—that offer comparative metaphysical narratives. None of these avenues, taken alone, establishes theology or science; but together they form a disciplined programme that both respects naturalist critiques and allows theological frameworks to enter the argument as substantive, not merely terminological, alternatives. Above all, the enterprise must remain self-critical: retaining open questions is not a weakness but a methodological requirement for a philosophy that seeks to keep reality readable while recognising the limits of our reading.

Conclusion — Reality: Ordered, Intelligible, or Readable?

The argument with which this chapter begins is deceptively simple but philosophically weighty: the world is not an unstructured flux indifferent to inquiry; it is, in important respects, readable. By this I mean not merely that the world is intelligible in some loose sense, nor that it is literally a book to be decoded, but that there is a stable conjunction of three elements that makes empirical and theoretical

⁴⁴⁴Nagel, *Mind and Cosmos*. Chalmers, *Conscious Mind*. Dennett, *Darwin's Dangerous Idea*.

⁴⁴⁵Boyd, "Current Status of Scientific Realism," 41–82. van Fraassen, *Scientific Image*, 12. Popper, *Logic of Scientific Discovery*, 57–73.

inquiry possible: objective structure (constraints and regularities in the world), epistemic accessibility (the capacity of organisms and instruments to register and represent those structures), and corrective interaction (the possibility of error, testing, and revision). Readability, so defined, isolates a relation among reality's form, our cognitive and representational means, and the methodological practises that allow us to improve our representations over time.

To make these components more concrete: objective structure is exemplified by the way planetary motions constrain possible trajectories, enabling prediction; epistemic accessibility is instantiated in the ability to encode and transmit information about such motions—a domain where Claude Shannon's formal characterisation of information remains instructive ⁴⁴⁶; corrective interaction is seen in the iterative procedures of science—prediction, observation, refutation, and refinement—captured in different ways by Popper's emphasis on falsifiability and Kuhn's analysis of paradigm change ⁴⁴⁷. Informational accounts of the relation between states of the world and subjectively available structures (Dretske) and more recent formulations in the philosophy of information (Floridi) help to systematise how signals, representations, and semantic content can be understood without collapsing into metaphysical quicksand ⁴⁴⁸.

Several philosophical positions offer distinct interpretations of this triad. Scientific realists take the success of representation as evidence that our theories track mind-independent structures; Putnam and Boyd, for example, argue that explanatory and predictive success gives us reason to trust the referential capacities of science ⁴⁴⁹. Instrumentalists and constructive empiricists, however, urge caution: success may be merely pragmatic, enabling reliable prediction without committing us to a metaphysics of unobservable entities (van Fraassen) ⁴⁵⁰. Radical critics remind us that observation is theory-laden (Quine) and that revolutions in science sometimes render previous frameworks unintelligible from the new standpoint (Kuhn) ⁴⁵¹. The debate is thus not settled by the mere fact that reading reality works much of the time; the epistemic significance of that success remains contested.

Objections that challenge the notion of readability must therefore be taken seriously. One line of critique is underdetermination: multiple incompatible theories may fit the same phenomena, so success underdetermines truth. Another is the evolutionary or instrumental explanation of cognitive success: natural selection might produce organisms that are merely reliable for fitness, not truth-tracking, and the apparent “fit” between human cognition and world structure could be explained without invoking metaphysical realism. A third concerns the conspicuous effectiveness of mathematics in science—Wigner's famous puzzle—which sits uneasily with both a purely instrumental account and a naïve

⁴⁴⁶Shannon, "Mathematical Theory of Communication."

⁴⁴⁷Popper, *Logic of Scientific Discovery*, 57–73. Kuhn, *Structure of Scientific Revolutions*, 43–52.

⁴⁴⁸Dretske, *Knowledge and the Flow of Information*, 44–46. Floridi, *Philosophy of Information*, 80–107.

⁴⁴⁹Putnam, *Mathematics, Matter and Method*, 60–78. Boyd, "Current Status of Scientific Realism," 41–82.

⁴⁵⁰van Fraassen, *Scientific Image*, 15–19.

⁴⁵¹Quine, *Word and Object*, 23–72. Kuhn, *Structure of Scientific Revolutions*, 92–110.

realism about mathematical objects ⁴⁵². Any account of readability must therefore respect these objections by explaining why success in reading is epistemically noteworthy without illicitly inferring metaphysics from practice.

It is here that the Qur'ānic notion of āyāt provides a distinctive metaphysical horizon. In Qur'ānic usage āyah (plural āyāt) denotes both the revealed verses and the signs manifest in creation, a theological motif that invites reading the world as meaningful without reducing it to a scripture-literalism ⁴⁵³. Classical Islamic commentators and modern scholars have elaborated this double sense: the cosmos as created and communicative, not merely present as brute matter but as arrayed with signs that point beyond themselves (see Izutsu, Rahman, and Al-Attas for interpretative lines) ⁴⁵⁴. This framework does not dictate concordism—one cannot simply read scientific facts permissively into sacred text—nor does it licence arbitrary hermeneutics. Instead it furnishes a metaphysical schema in which the world's readability is intelligible: a created order intended to be read, yet accessible only through finite, fallible inquiry.

Semiotic resources from Peirce and Eco help here by clarifying how signs can have both indexical and interpretant roles without collapsing into instrumentalism or theological literalism ⁴⁵⁵. Similarly, accounts of intentionality and information (Searle, Dretske) illuminate how human minds relate to signs and signals in ways that render reading meaningful while remaining subject to empirical correction ⁴⁵⁶. Debates about consciousness and cognition (Dennett, Chalmers, Nagel) underscore that the capacity to read presupposes explanatory work about minds, but that this work need not settle metaphysical disputes in advance ⁴⁵⁷.

The appropriate conclusion is therefore modest and methodological rather than triumphalist: the persistent success of reading reality is a legitimate metaphysical problem that demands explanation. A Qur'ānic theistic ontology centred on creation and āyāt offers one coherent way of integrating the problem's dimensions—objective order, epistemic access, and semiosis—without bypassing scientific method. Its adequacy should be judged by the same standards we apply to any interpretive framework: conceptual clarity, explanatory scope, resistance to ad hoc manoeuvres, and an openness to critical revision. In other words, recognising the world's readability need not compel a single metaphysical verdict; it does, however, obligate us to take seriously both naturalist and theistic accounts, and to hold every candidate explanation accountable to the corrective discipline that readability itself requires.

⁴⁵²Wigner, "Unreasonable Effectiveness of Mathematics."

⁴⁵³Qur'ān 2:106; 41:37; 45:3–5, trans. M. A. S. Abdel Haleem (Oxford: Oxford University Press, 2004).

⁴⁵⁴Izutsu, *God and Man in the Qur'an*, 142–162. Rahman, *Major Themes of the Qur'an*, 65–79. al-Attas, *Prolegomena to the Metaphysics of Islam*, 14–16.

⁴⁵⁵Peirce, *Philosophical Writings*, 99. Eco, *Theory of Semiotics*.

⁴⁵⁶Searle, *Intentionality*, 1. Dretske, *Knowledge and the Flow of Information*, 44–46.

⁴⁵⁷Dennett, *Darwin's Dangerous Idea*. Chalmers, *Conscious Mind*. Nagel, *Mind and Cosmos*.

Comparative Summary of Metaphysical Options

The following matrix summarizes the explanatory pressure points developed throughout the argument. It is not a mechanical scorecard. Its purpose is to make explicit what each framework illuminates and what it leaves in need of further explanation.

Framework	Primary strength	Main pressure point	Relation to readability
Brute reality	Honest stopping point and ontological economy	Leaves the conjunction of order, access, and meaning unexplained	Treats readability as ultimate but unexplained
Naturalism	Explains adaptation, causal interaction, and social correction	May distribute the phenomenon across accounts without a common ground	Explains many mechanisms of reading
Structural realism	Clarifies continuity of relational form through theory change	Does not by itself explain epistemic access or signification	Illuminates what is read
Informational ontology	Connects distinction, organization, and process	Must bridge formal information to semantic meaning	Offers a vocabulary for mediation
Classical theism	Unifies contingent order, rational knowers, and normativity	Faces problems of evil, divine hiddenness, and explanatory cost	Interprets readability as derivative of rational creation

Selected Bibliography

- al-Attas, Syed Muhammad Naquib. *Prolegomena to the Metaphysics of Islam*. Kuala Lumpur: International Institute of Islamic Thought and Civilization, 1995.
- al-Ghazālī, Abū Ḥāmid. *The Incoherence of the Philosophers*. Translated by Michael E. Marmura. Provo: Brigham Young University Press, 2000.
- Aristotle. *Physics*. Translated by C. D. C. Reeve. Indianapolis: Hackett, 2018.
- Boyd, Richard. "The Current Status of Scientific Realism." In *Scientific Realism*, edited by Jarrett Leplin. Berkeley: University of California Press, 1984.
- Chalmers, David J. *The Conscious Mind*. Oxford: Oxford University Press, 1996.
- Clark, Andy. *Supersizing the Mind*. Oxford: Oxford University Press, 2008.
- Clark, Andy. *Surfing Uncertainty: Prediction, Action, and the Embodied Mind*. Oxford: Oxford University Press, 2016.
- Dennett, Daniel C. *Darwin's Dangerous Idea*. New York: Simon & Schuster, 1995.
- Dretske, Fred. *Knowledge and the Flow of Information*. Cambridge, MA: MIT Press, 1981.
- Eco, Umberto. *A Theory of Semiotics*. Bloomington: Indiana University Press, 1976.
- Floridi, Luciano. *The Philosophy of Information*. Oxford: Oxford University Press, 2011.
- Hacking, Ian. *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*. Cambridge: Cambridge University Press, 1983.
- Ibn Kathīr. *Tafsir Ibn Kathir (Abridged)*. 10 vols. Translated and abridged under the supervision of Safi-ur-Rahman al-Mubarakpuri. Riyadh: Darussalam, 2000.
- Ibn Rushd (Averroes). *The Decisive Treatise*. Translated by Charles E. Butterworth. Provo: Brigham Young University Press, 2001.
- Iqbal, Muhammad. *The Reconstruction of Religious Thought in Islam*. Edited by M. Saeed Sheikh. Stanford, CA: Stanford University Press, 2013.
- Izutsu, Toshihiko. *God and Man in the Qur'an*. Kuala Lumpur: Islamic Book Trust, 2002.
- Kant, Immanuel. *Critique of Pure Reason*. Translated by Paul Guyer and Allen W. Wood. Cambridge: Cambridge University Press, 1998.
- Kuhn, Thomas S. *The Structure of Scientific Revolutions*. 4th ed. Chicago: University of Chicago Press, 2012.
- Ladyman, James, and Don Ross. *Every Thing Must Go*. Oxford: Oxford University Press, 2007.
- Madigan, Daniel A. *The Qur'an's Self-Image: Writing and Authority in Islam's Scripture*. Princeton: Princeton University Press, 2001.
- Nagel, Thomas. *Mind and Cosmos*. Oxford: Oxford University Press, 2012.

- Nasr, Seyyed Hossein. *An Introduction to Islamic Cosmological Doctrines*. Cambridge, MA: Harvard University Press, 1964.
- Neuwirth, Angelika, Nicolai Sinai, and Michael Marx, eds. *The Qur'ān in Context: Historical and Literary Investigations into the Qur'ānic Milieu*. Leiden: Brill, 2011.
- Nöldeke, Theodor, Friedrich Schwally, Gotthelf Bergsträsser, and Otto Pretzl. *The History of the Qur'ān*. Translated and edited by Wolfgang H. Behn. Leiden: Brill, 2013.
- Peirce, Charles S. *Philosophical Writings of Peirce*. Edited by Justus Buchler. New York: Dover, 1955.
- Popper, Karl. *The Logic of Scientific Discovery*. London: Routledge, 2002.
- Putnam, Hilary. *Mathematics, Matter and Method*. Cambridge: Cambridge University Press, 1975.
- Quine, W. V. O. *Word and Object*. Cambridge, MA: MIT Press, 1960.
- The Qur'an: A New Translation*. Translated by M. A. S. Abdel Haleem. Oxford: Oxford University Press, 2004.
- Rahman, Fazlur. *Major Themes of the Qur'an*. 2nd ed. Chicago: University of Chicago Press, 2009.
- Searle, John R. *Intentionality*. Cambridge: Cambridge University Press, 1983.
- Shannon, Claude E. "A Mathematical Theory of Communication." *Bell System Technical Journal* 27 (1948): 379-423, 623-656.
- al-Tabarī, Abū Ja'far Muhammad ibn Jarīr. *The Commentary on the Qur'ān: Being an Abridged Translation of Jāmi' al-Bayān 'an Ta'wīl Āy al-Qur'ān*. Vol. 1. Translated by J. Cooper. Edited by W. F. Madelung and A. Jones. Oxford: Oxford University Press, 1987.
- van Fraassen, Bas C. *The Scientific Image*. Oxford: Oxford University Press, 1980.
- Wigner, Eugene P. "The Unreasonable Effectiveness of Mathematics in the Natural Sciences." *Communications in Pure and Applied Mathematics* 13 (1960): 1-14.

Glossary of Core Terms

Term	Working definition
Readability	The objective availability of stable aspects of reality to constrained, corrigible, and integrative inquiry.
Intelligibility	The broader possibility that reality can be grasped by reason or understanding.
Corrigibility	The openness of a representation or inquiry to correction by evidence, argument, or encounter.
Representation	A materially or symbolically embodied structure that stands in a disciplined relation to what it represents.
Āyah / Āyāt	A sign, indication, or verse; in this monograph, a term that links discernible reality with directed significance without collapsing the two.
Abduction	Inference to the best available explanation, distinguished from deductive entailment and inductive generalization.