INTRODUCTION

The Route from Intelligibility to Cosmogenesis

Modern cosmology describes the universe with remarkable precision. Its models connect the expansion of spacetime, the structure of galaxies, the cosmic background radiation, and the history of matter within a coherent observational picture. That success invites a question of another kind: what makes a physical history possible when the universe itself is the whole system to be explained?

The Prologue has opened that question as an invitation. The Introduction sets out the route by which the book will pursue it. We begin with the conditions of physical intelligibility, follow their implications for causal order and irreversible history, and then ask what sort of geometry and gravitation can realize them. When these requirements reach the limit of a single causal regime, a further problem appears: whether a distinct regime can follow, and under what physical conditions. Only then does the investigation become quantitative.

The order matters. Each result restricts what can be assumed at the next stage, and each new physical ingredient answers a question the preceding reasoning has brought into focus. The final aim is a cosmogenic proposition reached by successive constraints rather than selected in advance and adjusted to fit them.

The Method: Four Roles in One Argument

The method is deductive in its organization and explicit about its sources. Four kinds of ingredients work together, each with a different status.

Foundational conditions define the class of universes under examination. The starting requirement is that a universe must be intelligible from within: physical effects must form a coherent order, persist as records, and condition subsequent history. Finite distinguishable capacity is an additional restriction adopted for that class. The separate historical-closure hypothesis H_{C} restricts the continuation of regimes considered in the succession programme; it is not deduced from capacity and irreversibility alone.

Established results of physics provide the next level. Relativity, thermodynamics, quantum theory, and gravitational physics enter when the questions raised by the argument require their specific content. Their conclusions are used within the physical and mathematical settings in which they are warranted.

Explicitly adopted physical inputs supply information that the preceding steps cannot fix. The effective account of a nonsingular high-curvature transition, the numerical identification of the first effective field regime, and the later Regime-Scale Correspondence enter the particular quantitative realization developed in this book. Their status is explicit: they are adopted inputs, not results uniquely dictated by the preceding structural argument.

Derived and conditional consequences are the fourth category. Some follow from the combined premises and dynamical assumptions; others depend on whether a proposed mediation or subsequent physical phase can actually occur. Benchmarks make comparisons possible, and open questions mark precisely where further physics is needed. This distinction enables the reader to assess each conclusion without mistaking a useful realization for a universal theorem.

The result is a chain of dependence that remains open to criticism at every link. The strength of a conclusion rests on the conditions from which it follows. Where those conditions leave a choice, the choice is made visible; where physics offers a test, the claim can be confronted with it.

The Path Through the Chapters

Chapters 1–4 establish the conditions of a physical history. Chapter 1 asks what explanation means when the object to be explained has no external environment. Chapter 2 develops the causal coherence needed for interactions to form an ordered history. Chapter 3 shows why records and irreversible change matter to that order. Chapter 4 distinguishes adopted finite distinguishable capacity from the additional historical-closure hypothesis H_{C}. This structural limit is called closure.

Closure changes the question. A physical history requires a supporting structure, and that structure cannot remain independent of what it supports. Chapters 5 and 6 therefore turn to geometry and gravitation. They examine how causal and inertial relations can acquire geometric form and which classical dynamics can realize that form under the assumptions explicitly chosen for the relativistic description. The result is a physically constrained setting in which the next question becomes meaningful.

If a regime reaches closure, a possible continuation must be understood as more than an extension of the same history. Chapter 7 develops the meaning of succession between distinct causal regimes that do not share an external clock or transmit detailed physical states. Chapter 8 then looks for a physical mediator capable of meeting the causal requirements of such a transition. Gravitational collapse and black-hole interiors enter here as candidates for the relevant conditions. The investigation distinguishes a local high-curvature transition from the realization of a complete successor regime.

With that distinction in place, Chapter 9 brings the argument to its quantitative interface. An adopted nonsingular transition supplies the starting point for a radiation-like bridge toward a first effective description of fields. The bridge dynamics yield a definite attenuation of the energy associated with the reference domain. To compare different regimes, the book then adopts a separate Regime-Scale Correspondence. Its simplicity motivates the choice, while its physical necessity and uniqueness remain unproved.

Chapter 10 follows the consequences of combining the bridge result with that correspondence. It obtains a formal ordering of characteristic cosmic scales, distinguishes the quantum structural floor from the benchmark relevant to continued mediation, and places a chosen reference associated with our observable universe within this ordering. The placement is a

relative comparison, not an observed generation number. The possible accelerated history of our universe enters afterward as a separate, conditional realization.

Chapters 11–13 examine how far this architecture can be taken. Chapter 11 checks its quantitative relations and their sensitivity to the inputs. Chapter 12 identifies the different ways in which future physics and observation could confirm, constrain, or challenge its layers. Chapter 13 brings the results together into the proposed cosmogenic account, separating the ordered hierarchy of possible scales from the demanding question of which successions are physically realized.

The Conclusions assess the achievement and its limits. The Epilogue and Conceptual Perspective consider its wider significance; the appendices provide the detailed derivations and checks for readers who wish to pursue them. The main route is designed to be followed before entering that technical apparatus.

Finitude, Succession, and the Ancestral Question

Finitude has a positive and precise place in this argument. The adopted closure hypothesis H_{C} supplies the additional structural limit on record-bearing extensibility for the subclass studied. This result does not describe a catastrophe or assign a date to the limit; it establishes why continuation under an unchanged causal architecture cannot be taken as indefinitely available.

This work adopts finite ancestry as a physically revisable hypothesis about our lineage (§13.6). The adopted quantitative recurrence makes the alternative precise: an indefinitely realized ancestry would require characteristic regime energies to grow without bound. This Ancestral Divergence Result follows from the stated scaling architecture.

The physical question is how a finite ancestral lineage could be realized and globally completed. Within restricted Kottler and radiation-era mediation channels, uniform physical bounds yield finite-depth results; Appendix I.10A states the conditions and refers to their derivations (Steinmann 2026). Determining which complete histories can compose into the lineage leading to our reference regime is a further problem of physical selection and completion. The identity, scale, and ancestral depth of its first regime remain undetermined.

What This Book Does Not Do

The scope of the inquiry is deliberately clear. It develops a constrained account of cosmogenesis, with the established achievements of cosmology as its physical setting. It does not propose a fundamental theory of quantum gravity, derive every natural constant, select a unique Grand Unified Theory, or replace the phenomenology of dark matter and dark energy. Those tasks demand additional physics and belong to other levels of explanation.

The proposed succession has equally definite limits. The argument neither assumes identical particles and laws in different regimes nor identifies every black hole as the origin of another universe. Its interregime correspondence is adopted for minimality, not fitted to a preferred genealogical outcome. An inflationary phase may describe our regime without becoming a universal requirement. And the formal ordering of scales remains distinct from an observed

family tree: finite ancestry is a hypothesis about our lineage, while physical realization of the lineage, the properties of its initial regime, and its member count remain undetermined.

These boundaries tell the reader what kind of answer to expect. The book seeks to establish what can be deduced from the specified conditions, what physical inputs are needed to continue, and what would have to be learned before a conditional possibility becomes a demonstrated cosmological history. Its ambition is not smaller for being explicit about its limits; its claims can be evaluated at exactly the point where each enters the chain.

The inquiry can now begin at its most elementary level. Before asking where our universe came from, Chapter 1 asks what it means to explain a universe from within—and what such an explanation requires beyond a successful description.