Insight & Beyond: Lecture 7, Part I:
Chapter 4 §2: "Complementarity in the Known": Emergent Probability.

[0:00]
• In-depth discussion of Emergent Probability and Schemes of Recurrence.
• Linking of a cycle of events by one or more classical laws (correlations).
• Example of hydrological cycle.

[4:45]
• Additional examples from biology; the ATP cycle and the oxidative phosphorylation cycle. The latter as a conditioned scheme of recurrence.
• The pervasiveness of schemes of recurrence throughout the world.

[9:34]
• Schemes of recurrence as conditioned.
• The dependence of schemes of recurrence on the classical correlations (laws) that link their constituent events.
• Discussion of: "What does it mean for classical correlations to be abstract?"
• What conditions enable classical laws to operate at all?
• Nonsystematic processes as setting the conditions of emergence for classical laws to operate and for schemes of recurrence to appear.
• *A* is one condition for *B*, but there is also a vast set, or environment, of "other conditions being equal."

[16:45]
• Diagram & elucidation of how schemes of recurrence are conditioned by the way that their constituent links are conditioned.

[18:22]
• "Quasi-Schemes of Recurrence" as Non-Systematic.
• In the absence of the fulfillment of environmental conditions for a scheme of recurrence, the sequences of individual events of a scheme of occurrence can still occur, but as a merely random, independent series of events.
    • Student question as to whether this model is restricted to the natural sciences.
    • Student question as to whether the scheme of recurrence is circular.

[23:58]
• Probability of Quasi-Schemes of Recurrence resumed. The unlikelihood of a series of events occurring in a given pattern (A, B, C, D) if no classical correlations are in play.
• Then the probability of A & B & C & D … will be $p \cdot q \cdot r \cdot s$ …
    (N.B.: The probability associated with event D on the diagram should have been *s*, not *q*.)
• Then the probability of even 4 such events in sequence would be extraordinarily low.

[26:25]

• Student question about whether the probabilities of events depends on to what the events are related. The legitimacy of isolating and selecting particular events; i.e., odds of me winning the lottery versus someone's winning the lottery.
– "What is the probability of this *single* event?" is a meaningless question.
– Discussion of probabilities, statistical frequencies, statistical methods as *only* applicable to collections or populations in a concrete, determinate space and time.

[34:00]

• Question about the diagram of the series of events where the arrows for the classical correlations have been subtracted from the cycle.
• Response. Water jumping out of a glass does not violate any classical laws; it is just extremely improbable.
• Question: Is it possible for these quasi-schemes of recurrence to create a situation where they become more probable? Only if they change the conditions of the environment where the classical correlations actually begin to forge connections among the events.

[37:48]

• Diagram of the evolution of series of events in time, albeit not connected by classical laws.
• Extreme unlikelihood of *multiple* occurrences of a scheme in such a case.
• Brief discussion of the implications for Intelligent Design and the order of the universe as such.
• Scientists, therefore, treat recurrent schemes as heuristically indicative of some classical correlation.

[47:40]

• Question as to whether the order of the events in the quasi-scheme of recurrence affects the probability.

[48:30]

• Probabilities of Conditions
• Comparing classical and statistical laws, i.e., what happens when conditions are fulfilled versus how often one may expect them to be fulfilled.
• The Kind of Intelligibility that Probability is: a "funny kind of governance of events," different from the intelligibility of classical correlations of events.
• Not the kind of causality we are accustomed to thinking of.
• Ideal frequencies, probabilities, can change over time – setting new norms from which events diverge nonsystematically.
• Empirical method requisite for determining probabilities (ideal frequencies).

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• Shift of Probabilities of Emergence when conditions are fulfilled.
• Reasons for dramatically increased odds of the recurrence of the scheme.
– Any one of the events in the scheme triggers the whole cycle.
– Probability jumps from a product to a sum.
– The probability of A & B & C & D … will now be the much higher $p + q + r + s$ …

[1:01:10]
• Animation of shift of probabilities of emergence when conditions are fulfilled.
• But the conditions for this shift of probabilities, and for the emergence of the scheme, are fulfilled nonsystematically.

[1:06:20]
• Nonsystematic Assembly of Conditions source of Creative Emergences.
• Genuine self-appropriation of natural science implies that the universe is creative, not deterministic.
• Prior schemes of Recurrence as Conditions for Later Schemes.
• Pyramids of schemes resting on schemes.
• Universe as upwardly but indeterminately directed.
• Teleology of the universe: Directed but an unknown, unpredetermined outcome.

[1:09:38]
Student Questions:
• Question about development of increased systematicity of the universe over time.
    – Distinction between the universe as having a more systematic elements *versus* being more systematic as a whole.
• Question about how the events and their probabilities can be independent, have no intrinsic connection to one another, if there are conditions.
    – Conditions have to do with classical laws, not probabilities. Methodological presumption of events as independent.

[1:15:00]
• Question about whether it is ever possible to truly know ideal frequencies, given their dependence on time and space and their changeability.
    – Methodological decisions help determine what is statistically significant, and these methods are evolving.
• Has a scheme of recurrence ever proven to be merely a quasi-scheme of recurrence, or vice versa? Isn't the onus on a scientist to prove that a series of events is really a scheme of recurrence, and not a quasi-scheme of recurrence?
    – Discussion of both situations, some illustrations, and their implications.

End of Part I