

## Rolston lectures: Goshen College

### Lecture 1.

#### Generating Life on Earth: Five Looming Questions

(1) Creating information. In Newtonian nature, there were two metaphysical fundamentals: matter and energy. Einstein reduced these to one: matter-energy. Biologists still claim two: matter-energy and information. The genetic information explosion on Earth opens up challenging questions.

(2) Contingent versus inevitable creativity. Biologists divide across a spectrum asking whether this cybernetic evolutionary history is contingent, probable, inevitable. Biodiversity and biocomplexity have escalated on Earth, but is this a trajectory or heading of life? Many biologists find that such results are not predictable from Darwinian natural selection. Others object to Western scientists reading progress into a random process.

(3) Possibility space: Omnipresent vs. emerging. Were the subsequent possibilities always there, or did new possibilities originate during evolutionary history? Events come naturally, but critical turnings are surprising; possibility spaces open up en route.

(4) Co-option generating novel possibilities. Life co-opts constructions earlier working along unrelated pathways to start serving novel functions, seemingly contingent events that originate new possibility spaces, in which advanced information is generated. New search space opens up; escalating co-option and serendipity drives the information explosion, generating biodiversity and biocomplexity.

(5) Anthropic biology? The information explosion on Earth becomes focused in humans, whose brains are the most complex entities in the known universe. Human brains sponsor spirited minds capable of cumulative transmissible cultures. This opens up trans-genetic possibility space that greatly accelerates the information explosion on Earth. By discovery and transmission of ideas, by education and decision (reconfiguring their synaptic networks) humans face an open future with promise and peril unprecedented in the history of the planet.

Such looming questions about generating life on Earth open up possibility space for faith in God. We live on a wonderland Earth and we ourselves are the apex of these wonders.

### Lecture 2

#### Human Uniqueness: Spirited Mind

Humans are the most sophisticated of known natural products. In our hundred and fifty pounds of protoplasm, in our three-pound brain is more operational organization than in the whole of the Andromeda galaxy. Animal brains are already impressive. Such cognitive development has come to a striking expression point in the hominid lines leading to Homo sapiens, going from about 300 to 1,400 cubic centimeters of cranial capacity. The connecting fibers in a human brain, extended, would wrap around the Earth forty times.

Some trans-genetic threshold seems to have been crossed. The human brain is of such complexity that descriptive numbers are astronomical and difficult to fathom. A typical estimate is

$10^{12}$  neurons, each with several thousand synapses (possibly tens of thousands). Each neuron can "talk" to many others. This network, formed and re-formed, makes possible virtually endless mental activity. The result of such combinatorial explosion is that the human brain is capable of forming more possible thoughts than there are atoms in the universe.

The surprise is that this intelligence becomes reflectively self-conscious and builds cumulative transmissible cultures. An information explosion gets pinpointed in humans. Humans alone have "a theory of mind"; they know that there are ideas in other minds, making linguistic cultures possible. Our ideas and our practices configure and re-configure our own sponsoring brain structures. In the vocabulary of neuroscience, we have "mutable maps." For example, with the decision to play a violin well, and resolute practice, string musicians alter the structural configuration of their brains to facilitate fingering the strings with one arm and drawing the bow with the other. The human brain is as open as it is wired up. Our minds shape our brains.

Once critics might have said that mind is rare, and drawn the conclusion that mind is an epiphenomenon, a freakish accident. But scientists now realize that anomalous events can be quite revelatory of deep-down truths. If so, what we humans have cognitively become, and what we morally ought to be, our trajectory, reveals a great deal more than our origins in the matter out of which we were launched and have been assembled. Perhaps after all, this primate rising from the dust of the Earth, on becoming so remarkably spirited, bears the image of God

## Lecture 3

### Three Big Bangs

Scientific natural history discovers "three big bangs," each marking a serendipitous singularity and cumulating to generate the most complex intelligence yet known. (1) At the primordial big bang, matter-energy appears, initially in simpler forms, but with the remarkable capacity to generate, in stellar fusion, heavier elements, collecting into pacted planets, without which life would not be possible.

(2) Life explodes on Earth with the serendipitous generation of DNA discovering, storing, transferring information. Across a singular natural history, life persists in the midst of its perpetual perishing, generating and regenerating billions of species increasing in idiographic biodiversity, with trajectories generating escalating biocomplexity.

(3) Primate brains reach a combinatorial explosion in the cognitive human brain, capable of more thoughts than there are atoms of matter. The human genius, a "massive singularity," crosses a trans-genetic threshold, generating language and making possible cumulative transmissible cultures, radically novel in kind and in scale. Life, previously genetic, becomes ideational; ideas pass from mind to mind. Ideas generate ideals. Mind-sharing generates care-sharing. Humans are spirited subjects, evidenced in their capacities and concerns for science, ethics, and religion.

The nature of matter-energy (the first big bang), the nature of genes and their genesis (the second big bang), invites those at the center of such complex caring intelligence (the third big bang) to wonder where they are, who they are, and what they ought to do. The sciences increasingly demand that humans ask ultimate questions about the implications of these complications, wondering whether there is sacred Logos in, with, and under a cybernetic system with such breakthrough creativity.