

Book Review: "A Second Genesis – Stepping-stones towards Intelligibility of Nature" by Julian Chela-Flores (World Scientific, Singapore, 2009)

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In this book of 229 pages spread over 14 short chapters, supplemented by a fairly comprehensive set of annotations and a glossary at the end, Dr. Julian Chela-Flores, a theoretical physicist turned astrobiologist, has examined some of the deeper implications of a possible second Genesis, *i.e.*, the emergence of life (or rather of intelligent life in particular) beyond our Earth, for the three natural cultures of humanity, namely, Science, Theology, and Philosophy. These three together define the human condition, but do seem to have internal natural boundaries. Thus, *e.g.*, the religion based on faith does not have to seek any justification from the physical laws that be. These three human cultures have given frankly conflicting views of the intelligibility of Nature – of the origin of life and its possibly common ancestry, its evolution, and the distribution of life in the universe. The three conflicting cultures have been hotly debated over the past centuries, and indeed continue to be at the frontiers of the sciences and the humanities today. Now, given that the 21st century may well belong to Biology and Precision Cosmology, and that several solar systems other than our own (with exoplanets some quite similar to our Earth) have already been detected, **astrobiology** seems well poised to address meaningfully and inclusively the question of the intelligibility of Nature, and life in the universe and its destiny. The book is carefully written in plain English (there are no equations in this book!) and demands no special state of preparedness on the part of the reader, except that it does require a thoughtful reading and quiet

meditation on the material so read. It naturally assumes a readership which is frankly curious about these disturbing almost existential questions: Is there a Design in the Universe and is there a divine prime mover; or, is it purely a case of Darwinian evolution by natural selection given some contingent randomness, all operating well within the physical laws that be. If latter, is there a universal convergence at the biochemical, biological (possibly cosmological), and neuroscientific levels, *i.e.*, will the tape of evolution if re-run reproduce essentially a life with the same general characteristics that we are familiar with. Is intelligent life a cosmic imperative and very widely distributed all over the universe. Is there an evidence at all for a purpose. Then, what about the ethics and the morality (with their mood which is essentially imperative). Are these imperatives reducible to the physical laws, whose mood is frankly in the infinitive. And finally, what about the oft quoted Anthropic Principle, *i.e.*, how come Nature seems to be finely tuned so as to support the life as we know it. (Or, is it the case that life merely adapts to the physical universe that there be). These are some of the questions the author has posed and explored in the spirit of a dialogue and looking for an inclusive consilience. Here, he is convinced of the view that a dialogue among the three natural cultures is absolutely essential for the intelligibility of nature, and that now is the time for it. This is because **astrobiology** is uniquely placed to explore these riddles with reasonable authority made possible by the spectacular recent technological developments, and by the many space missions undertaken and some planned to explore the universe around us. Thus, for instance, there is a possibility of exploring the Jovian Satellite Europa for the signs of microbial life. In the process of discussing these issues, the author has introduced the reader to a number of awe-inspiring findings about the evolution of the cosmos itself – from the hot Big Bang with its fingerprints imprinted on the

cosmic microwave background radiation and its anisotropy, to the possibly accelerated expansion of the Universe now, and what drives these expansions. Also, the composition of the Universe which seems mostly empty of the observable matter that we are made of; the enigmas of the dark energy that makes up most of the energy content of the Universe; and also of the dark matter.

I think the author has succeeded in engaging the reader in this fascinating discourse without being too technical. In any case, he has provided a number of annotations and a comprehensive glossary to help the persistent reader along. I do, however, get the impression that the author has been somewhat repetitive throughout the 14 chapters of the book. But, on second thought such a repetition may actually facilitate absorption. Also, I would have expected the author to devote some more space to some of the difficult ideas discussed, *e.g.*, the idea of Process Philosophy deserves more than a passing mention. But, then there is the question of limitation of space.

Overall, I strongly recommend ***A Second Genesis*** to a readership interested generally in making sense of the recent breathtaking developments bearing on the evolution of the cosmos and the intelligibility of Nature. Personally, as a practicing theoretical physicist, I have found this book intelligible, fascinating and very thought provoking. Strongly recommended to public libraries.

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