



Was
Darwin
Wrong?



Is life an accident?

a review *by* Gert Korthof
11 Sep 2000 (update 16 Sep 2001)



'A Case Against Accident and Self-Organization' by Dean Overman basically consists of two main parts: 70 pages about the origin of life and 70 pages about 'fine tuning' (precision of values in particle astrophysics). This book is unique because the author combines 'Fine tuning' and 'Origin of life'.

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The Origin of Life

- Question: Is it mathematically possible that accidental or chance processes caused the first form of living matter from non-living matter?
- Answer: No, it is a mathematical impossibility that chance processes produced the first living matter.
- Question: Are current self-organization scenarios for the formation of the first living matter plausible?
- Answer: Current self-organization scenarios do not distinguish between order and complexity and fail to give a plausible method of generating sufficient information content.

Overman discusses calculations of the probability that life originated by chance. In 6 paragraphs he discusses Hoyle & Wickramasinghe, Yockey, Bradley & Thaxton, Morowitz, Bernd-Olaf Küppers. These authors discuss the chance origin of a single protein or a single bacterium and all conclude that single proteins or a single bacterium cannot arise by chance. Overman does not know that a bacterium is not the simplest form of life. The simplest free-living organism, *Mycoplasma genitalium*, has only 468 genes, so that number of genes would be closer to the simplest form of life. Not a bacterium with an estimated 2000 genes. However 468 is still a lot, and no origin-of-life-researcher proposes that something as *Mycoplasma* was the first form of life and arose spontaneously out of inorganic chemicals. The probability of a spontaneously origination of a single protein cytochrome-c is 2×10^{-44} (Yockey). Overman is so anxious to demonstrate his case that he forgets to note

that this probability is greater than the magic number 10^{-50} , and thus is allowed to originate by chance. Expressed in bits: cytochrome-c contains **233-374** bits (p75), but Overman fails to note that this is below the maximum allowed by chance: 500 bits (8). Overman hastily inserts a quote to show that the existence of 'wrong' non-proteinous amino acids could prevent the formation of a single cytochrome-c molecule. I will illustrate the error in this type of argument with the famous **birthday riddle** as told by John Allen Paulos:

- How many people would there have to be in a group, in order for the probability to be 50% that at least two people in it have the same birthday? This is not 183 (=365/2), but only **23** people! The counter-intuitive result is based upon a confusing of the chance of having two people with the same *specified* birthday, such as March 19, with the chance of two people having the same *unspecified* birthday (*any* birthday). (1).

So it could be with the birthday party of life. Cytochrome is like a 'specified birthday'. A serious investigation of the problem would include all possible molecules that have the same function as cytochrome. More general: all possible sets of molecules that together form a living cellular whole (see: Stuart Kauffman).

However Overman is right in principle that there are limits to what chance can do. We can accept a certain amount of luck, but not too much. This principle is accepted by mainstream scientists such as Manfred Eigen: "The genes found today cannot have arisen randomly, as it were by the throw of a dice" (2), Richard Dawkins and others. The important thing is that the details are crucial. The problem is that people like Overman narrow down the problem of the origin of life to their favourite riddle and stick to it. I will not go into further details here. It has been done in other places and by other persons (7), (4). I will only state here that mainstream scientists accept that life somehow arose in a natural way. They are not interested in the kind of riddles presented by Overman. Mainstream scientists are hardly interested to know the information content of life or seem to be interested in the distinction order/complexity (a very important distinction for the critics of evolution) (11). Of course

Overman knows what mainstream scientists think. He seems to have only one explanation for the fact that he belongs to a minority: mainstream scientists have a 'materialistic bias'.

Despite shortcomings and misunderstandings critics such as Overman highlight real problems in Darwinism. Problems sometimes described, nearly always de-emphasised or completely ignored in evolution textbooks. Problems often exaggerated by critics. It is a fact that the 'information gap' between life and non-life exists and does not get proper attention from mainstream science. So the benefit of reading the critics (not necessarily lawyers!) is that one learns about the problems in a scientific theory. And that has educational, scientific and entertaining value.



"A Case Against Accident and Self-Organization"

by Dean Overman

Rowman & Littlefield Publishers

1997, hardback

245 pages.

ISBN: 0-8476-8966-2

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Fine Tuning

Overman:

- Q: is it mathematically possible that accidental or chance processes caused the formation of the universe compossible with life?
- A: The probabilities of the precision of the values in particle astrophysics are too vanishingly small to be considered mathematically possible.
- Q: What is 'mathematically impossible'?
- A: "**Most** mathematicians normally regard anything with a probability of less than one in **10⁵⁰** as a mathematical impossibility.
- Q: What should a reasonable person accept?
- A: Reasonable persons accept a proposition with a probability of .999 over a proposition with a probability of .001 .
- Q: Why do some persons prefer the .001-proposition?
- A: Because of their faith in the ideology of materialism.

What is fine tuning?

The universe appears to be precisely fine tuned for the formation of life (p103). An example Overman gives of a fine tuned value: The emergence of life depended on the precision among the three masses: the proton mass (938.28 MeV), the electron mass (0.51 MeV) and the neutron mass (939.57 MeV). (p137-38). Were these values different then **atoms** could not exist. And further: "The proton is 1836 times heavier than the electron" (p137).

What is fine tuned for what?

"The universe appears to be precisely fine tuned for the formation of life". What is exactly "the universe"? Everything? 75% of the visible universe is hydrogen; 24% is helium and only 1% consists of heavy elements which life is built of. Is this observation predicted by the Fine Tuning theory? Is the universe fine tuned for the production of hydrogen and helium? More remarkably, our universe is made up of only 4% ordinary matter; the rest is a mixture of cold dark matter and an exotic 'dark energy' (14). Hardly a universe fine tuned for us. Does the Fine Tuning theory predict the production of:

- a. only left-handed amino acids (L),
- b. both left-handed and right-handed amino acids (L+D),
- c. only right-handed amino acids (D)

One would expect prediction **a** because L-amino acids are exclusively used in organisms. If it predicts what we observe (**b**) then why are D-amino acids produced at all considering that they are a hindrance for the origin of life? The specificity of Fine Tuning theory is low because it does not discriminate between **a** and **b**, although it discriminates between **a+b** and **c**. Consequently the predictive power is low. If one increases specificity and let the theory predict only **a** then the theory is refuted by fact **b**! (13).

In describing the goal of fine tuning Overman does not go further than: 'fine tuned for life'. However fine tuning for life would still be true if humans never emerged. There are no parameters uniquely fine tuned for humans. So again Fine Tuning does not discriminate between 'life' and 'humans'. Any fine tuning needs at least an additional intervention to create humans. It seems that thousands of further interventions are necessary to produce millions of biological species (6). This is not a parsimonious theory. So it follows that fine tuning on its own is not enough. In general: fine tuning creates **necessary**, but not **sufficient** conditions. It doesn't need much cosmological knowledge to see that particle physics is not enough to guarantee the origin of *our* solar system and *our* Earth and *our* Moon with all the properties they have (9).

Fine tuning is not only insufficient, a number of facts **contradict** fine tuning for life on

Earth. I mention only the fact that the Earth's surface was sterilised by asteroid impacts during the first 500 million years of the earth's existence. Additionally: our Earth is endowed with **favourable** as well with **unfavourable** conditions for life. For example the eruptions of supervolcanoes beneath Yellowstone National Park and Sumatra almost destroyed (human) life on Earth. Furthermore the *finite* span of life of the sun (in some 5 billion years the Sun will swell to become an ordinary red giant) is not compatible with enduring fine tuning for life. If fine tuning was an *intentional* act by an intelligent being, how to explain these facts?

Creating a home for life

Overman overlooked the fact that Fine Tuning the physical constants for life is not enough to create a habitable planet. If the universe were Fine Tuned for producing habitable planets, we would expect all planets to be habitable. However only 1 per cent of the Milky Way's stars have habitable planets. Clouds of dust and gas must have the right mixture of heavy and metallic elements if they are going to create Earth-like planets. If this 'metallicity' is too low, any rocky planets that formed would be small and the gravity of a small planet would be too weak to retain a viable



atmosphere (12). So fine tuning for life is one thing. Fine tuning for suitable planets for life is another thing. It is absent. More than 99% of the planets of the Milky Way are not suitable for life. Additionally multicellular terrestrial life depends on a stable climate. A stable climate depends on the stability of the Earth's axis and this in turn depends on the presence of our moon. The origin of our moon was a catastrophic collision with a large Mars-sized planet. A very lucky accident.

Fine Tuning and the Origin of life

Overman is not aware of an inevitable tension between his Fine Tuning and the way he describes the Origin of Life. This tension arises from contradictory conditions that **enable** and **disable** the origin of life. For example the spontaneous generation of the biological amino acids requires an atmosphere without oxygen and certain critical ratios of hydrogen and carbon dioxide. However oxygen was likely present in the early earth's atmosphere. "The presence of even a small amount of oxygen would **prevent** the formation of amino acids and nucleotides". (p41) Remarkably the atmosphere of the early earth seemed to be fine tuned to **prevent** the spontaneous origin of life!

Additionally the fact that both L- and D-amino acids are produced in equal proportions is a hindrance for the spontaneous origin of life. Overman is aware of this fact (p44). Again this is opposed to fine tuning which is supposed to enable the origin of life.

There is another contradiction between an evolutionary cosmology and a non-evolutionary biology. Remarkably Overman accepts an evolutionary cosmology: "After about 7.5 billion years our sun, earth and solar system **emerged** out of the Milky Way galaxy." (p126). By observing the way Overman describes fine tuning, we get additional hints about the relation of fine tuning and evolution:

- "... to allow for the **origination** of life" (p104)
- "... for the **emergence** of life in the universe" (p137,138)
- "... would preclude the **formation** of life" (p103,128,136)
- "... necessary for the **development** of life" (p149)

All this suggests an evolutionary worldview! He could have used 'the creation of life' in all 4 quotes. The word 'evolution' itself is present in a quote of Polkinghorne: "fine-tuning involved in spelling out the conditions that have permitted our **evolution**" (p173)

From all this I would conclude that according to Overman:

1. fine tuning is capable to produce all the galaxies, stars, planets and our own solar system by autonomous natural processes
2. fine tuning is done long before the actual emergence of life, for example when designing the big bang
3. fine tuning creates necessary conditions for the emergence of life and (my interpretation:) and is expected to be sufficient for the emergence of life, just as it is for the emergence of stars and planets.

In the fine tuning chapter Overman only talks about the precision of values **necessary** for life, but forgets to add "but not sufficient". And that is a significant omission. Because that would imply fine tuning is not enough. In the chapter about the origin of life Overman talks about "emergence of life from **accidental** processes". **Is it adequate to describe the origin of life as an "accident" after so much fine tuning for life?** From Overman's point of view a natural question to ask is 'Could the fine tuning not be designed to such a level that the emergence of life was inevitable?' Great confusion and contradiction arises when Overman tells us that the conditions on the early Earth were **unfavourable** for the origin of life. Ironically he uses Denton(1985) to make his case, but Denton(1998) believes that fine tuning includes the origin and evolution of life! (3).

When discussing the problems of the origin of life Overman forgets everything about fine tuning. It seems a perfect challenge for an Intelligent Fine Tuner (IFT) to fine tune the conditions of the earth for the spontaneous origin of life, but nothing of the sort is considered by Overman. Has life been created irreducible *on purpose*? Overman is so naive in forgetting all these inconsistencies.

Information and the Origin of Life

Polanyi and the irreducibility of life

Overman quoted two articles of Michael Polanyi(1967,1968), former professor of chemistry and of Social Studies. Polanyi pointed out that whereas the base pairing ability (A-T and C-G) is fully determined by the laws of chemistry, the DNA base **sequence** in DNA is not determined by laws of chemistry. Thanks to this fact DNA is able to form every conceivable sequence of bases of any length and any composition. Polanyi seems to be the first who formulated this non-trivial insight. This is not obvious to some scientists (10). Probably the misunderstanding is caused by focussing on the chemical necessity of the Watson-Crick base pairing, which is the basis of the double helix, but has nothing to do with the information contents of DNA. Information is in the sequence. A well-known feature of DNA, its **mutability**, could not exist if the sequence were a chemical necessity, because mutations change the sequence. (Mutability of the sequence is one of the foundations of neo-Darwinism). Even the *ability* to form a sequence is determined by the laws of chemistry. However the *sequence itself* is not determined by chemical laws. Of course this does not *contradict* the laws of chemistry! Before the discovery of the structure of DNA in 1953, Erwin Schrödinger(1944) proposed in *What is Life?* that the hereditary molecule must be an aperiodic crystal. Polanyi pointed out that these properties of DNA fulfil the definition of the technical concept of information: a linear arrangement of symbols, where 'symbols' stand for the 4 bases in DNA. So far I agree. I also agree that the linear arrangement of symbols is unique to life, not found in chemistry and physics. Another way of expressing this insight is by the concepts **order - complexity**. The order of a crystal is explained by chemical necessity, while complexity (=information) of DNA cannot be explained by chemical necessity.

But then Polanyi takes a further step and called this property "*Life's irreducible structure*" and concluded to "*Life transcending physics and chemistry*". I am fairly certain that Polanyi meant that life can not be explained by chemical and physical laws alone. People seem to be impressed by this kind of irreducibility. I agree with physical irreducibility but this certainly does not imply that life is **unexplainable**. We simply need *biological* laws to explain life. And for practical reasons alone biological laws cannot be fully reduced to chemical laws. The concepts 'left', 'right' are present in chemistry and biology. On the other hand, the concepts '**female**',

'male', 'father', 'mother' are biological concepts, that cannot be reduced 1:1 to chemical concepts, because there are no female or male molecules. No reason to worry. Life and biology just happens to have features like reproduction and sex that are absent from chemistry. No reason to declare sex supernatural. No reason to call information supernatural either. Creationists like Overman, Dembski, Behe are attracted to irreducibility. Especially when irreducibility is applied to the origin of life: if life is irreducible to physics, then how can life originate from physical non-life? In their hands Polanyi's 'irreducible' becomes 'unexplainable' becomes 'supernatural'. Information in DNA can be explained in terms of the uniquely biological concepts 'mutation' and 'natural selection'.

Polanyi makes two further comparisons of life and human artefacts: books and machines. The structure of a machine is in harmony with the laws of physics but cannot fully be explained by the laws of physics. The letters in a book are physical objects (ink) but the words and sentences cannot be explained physically. Nothing wrong with that, except that creationists can't resist to conclude from the comparison that life is an artefact too. Polanyi himself does not draw religious conclusions from his philosophy (14), but certainly Overman and Dembski are doing this. It can't be a coincidence that William Dembski was the director of the Michael Polanyi Center.

Order and Complexity confusion

Some critics attack Overman's order/complexity distinction or its importance. There is nothing wrong with the distinction. It is based on Kolmogorov-Chaitin complexity and is called 'algorithmic complexity' (5). A pattern has a low complexity; random sequences have the highest complexity. Only when using 'order' as opposed to 'chaos', it is legitimate to say organisms have 'order'. In all other cases 'order' has lower information content than 'complex'. It's remarkable that Overman knows all this without the benefit of reading Dembski(1999). (but Dembski(1994) is absent too). He must have extracted this from Yockey(1992). On the other hand it shows that Dembski(1999)'s originality is not in the idea that the information content of the genome could not have arisen by chance, but his elaboration of the idea.

Accident and the meaning of life.

Overman doesn't like the idea that the origin of life and the origin of humans are the result of an 'accident'. He seems to think that human life cannot have a meaning if it is the result of an 'accident'. However doesn't he realise that many properties of our bodies are the result of 'accidents'? For example being male or female, a significant determinant of how we live our lives, is the result of random fusion of an egg with an X- or Y-carrying sperm. So our sex is determined on the moment of fertilisation, not a second earlier. It cannot be planned in advance; there is no purpose in it. So being male or female is an 'accident'. Furthermore the chromosome composition of every individual is a random mixture of the 23 original paternal and 23 maternal chromosomes: a "genetic lottery". So the unique set of our genetic properties is also determined by 'accidents'. *Do these 'accidents' destroy the meaning of our life?*

Random events are the basis of Mendel's Laws, they are statistical laws.

1. Mendel's Law of segregation: hereditary factors come in pairs: one factor of the pair **randomly** ends up in a sperm or egg.
2. Mendel's Law of independent assortment of hereditary factors: the combination of hereditary factors in the parents is **randomised** when an egg or sperm is made.
3. Recombination (crossing over) adds a **random** exchange of homologous chromosome segments during the production of sperm or eggs
4. mutation adds an extra **random** factor to the production of eggs and sperm: single-base substitutions, insertions, deletions, inversions, duplications.
5. which of the million eggs is fused with which of the million sperms is also a **random** event.
6. **random** mutation in our body cells cause cancer.
7. in females one X-chromosome is **randomly** switched off in her body cells (16).

Therefore, the exact combination of hereditary characters we possess is not exclusively determined by our parents, but by a series of **random** events. *Does that make our life meaningless?*

Ethical implications

In a curious, mysterious 3-page chapter 'Ethical implications of chance or impersonal beginning' at the end of the book, Overman claims that an 'accidental' beginning of the universe implies that there is no basis for knowing what is right or wrong. It takes a great leap of imagination to see the logical connection between the two. How does Overman go for example from the observation "The proton is 1,836 times heavier than the electron" (p137), to absolute ethical values, such as 'Thou shalt not kill'? In general: How does one go from **fact to value**? How does one go from **is to ought**? Values cannot be established by observation and experiment. So I don't see how all the observations of 'fine tuning' taken together, could be used to derive any ethical value at all. Probably ethics is Overman's motivation to write the book, but to believe that values can be derived from fine-tuning is extremely naive.

Conclusion

Overman collected facts from the literature that support fine-tuning *and* the impossibility of spontaneous origin of life. Oddly enough, he did not attempt **to connect** fine-tuning and the irreducibility of life. He would have discovered that his evolutionary cosmology sharply contrasts with his non-evolutionary view of life. So his world view consists of two contradictory components and that makes his worldview as a whole inconsistent and powerless. Remarkably the words Overman uses do suggest an evolutionary origin of life. Especially the lack of a theory to explain the million of biological species hides the fact that his fine-tuning (natural law) **is not enough** and many additional 'interventions' are needed. Among the 'interventions' not mentioned are many planetary variables that cannot be set in advance. The need for 'interventions' increases as a consequence of his rejection of the standard Darwinian explanation for the information in life. At the same time the irreducibility of life, if true, makes a **complete** physical fine-tuning for life **impossible**. This again makes further 'interventions' necessary. So fine tuning could be the most parsimonious theory because it postulates only one unique event in time: the specification of the initial conditions of the universe. However subsequent 'interventions' destroy that beautiful parsimony. The result is an extremely unparsimonious theory. Theistic evolutionists belief that God created the laws of nature and the laws of nature created life. A theory that doesn't need interventions.

Overman's consistent use of the word 'accident' instead of 'random event' suggests that random events are bad (car accidents!). But random events could bring us luck (lottery!). Is life an accident? Life is neither an accident nor an intended result, but a possible outcome of existing physical conditions. □

Notes:

1. John Allen Paulos(1988), *Innumeracy*, p26-28.
2. Manfred Eigen(1996) *Steps towards Life*, p11.
3. see my [review](#) of *Nature's Destiny* on this site.
4. The "Information Challenge" by Richard Dawkins, *Skeptic* Vol 7 No 2 1999, pp64-69.
5. Hubert Yockey(1992) *Information theory and molecular biology*, p82.
6. see paragraph 'Directly created organisms' of the [review](#) of Remine's book on this site. For the principle of parsimony see my [review](#) of *Deep Time*.
7. Richard Carrier: [Are the Odds Against the Origin of Life Too Great to Accept?](#) (Richard Carrier writes as if the origin of life has been solved and critics like Overman refuse to see it).
8. Mathematician William Dembski accepts 10^{-50} or 500 bits as the absolute limit. See [review](#) paragraph 'Information of more than 500 bits is designed' on this site.
9. Peter Ward and Donald Brownlee(2000) *Rare Earth. Why complex life is uncommon in the universe*.
10. There are still scientists who think that chemical necessity is all we need to explain the origin of life, such as Vincent Icke, professor of astronomy at the University of Leiden and Amsterdam.
11. Independent of creationists and mainstream biologists, the new discipline of 'Artificial Life' claims that **life is about function, not form**. **What separates the living from the dead is not a matter of matter but resides in patterns of information**. John L. Casti reviews Steve Grand's *Creation: Life and How to*

- Make it*, Nature, **409**, 17-18 (2001).
12. "Ideal homes", New Scientist 7 April 2001, page 18.
 13. Professor Robert Hazen has a nice hypothesis for life's preference for L-amino acids. Scientific American, April 2001, page 68.
 14. information from Chris Goodman.
 15. Sean Carroll "Universal support", review of "Echo of the Big Bang", *Nature*, **424**, 373 (24 July 2003).
 16. David Bainbridge(2003) "The X in sex. How the X chromosome controls our lives". Chapter 3 "The double life of women".

Links:

- [Profile of Dean Overman](#) on the site of Winston & Strawn. His *A Case Against* is included in the list of publications.



- [email from Overman](#) on the feedback page.

Postscript [16 June 2003].

Overman did not write about his faith, and why he wrote this book (except the curious and mysterious 3-page chapter about ethical implications). However, he wrote an approving blurb for the book "Mere Creation. Science, Faith & Intelligent Design" edited by William Dembski(1998), demonstrating the link with the intelligent design movement.

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Copyright ©G.Korthof 2000.	First published: Sep 11 2000	updated: 2 Apr 2004 Postscript added: 16 June 2003