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Intelligent Design
and Creative Chaos

Intelligent Design

1. Introduction
2. Analyzing the problem
3. Recent insights from molecular genetics
4. 'Irreducibly' complex is not quite that
5. Theological aspects
6. Conclusions

Intelligent Design: Origin

- Atheists like Monod and Dawkins claim that evolution proceeds ‘by chance alone’. Chance becomes near-deity.
- Christians cannot accept this. But what is the alternative?
- Michael Behe, *Darwin’s Black Box* (1996):
 - Irreducibly complex systems not possible by evolution (too slow, loss of function by removal of one component), thus by **Intelligent Design**
 - God is not mentioned (‘scientific’; textbook issue)
 - Mechanism of ID is not explained

Analysis of the problem

- Behe raises valid scientific question:
Can sequence of mutation/selection steps produce complex biological systems in evolutionary time?
- He says No, but provides no scientific evidence
- ID appears to be a metaphysical or theological idea rather than a scientific hypothesis
- Shall first approach scientific side, then theological side

Behe's arguments

- Evolution too slow for development of irreducibly complex systems
His examples: visual system, bloodclotting, immune system, bacterial flagellum
- 'Irreducibly': removal of one component causes loss of function. Would exclude evolutionary development (mouse trap idea)

Unanswered questions

- What is the mechanism of ID?
- How frequently does ID occur?
- What percentage of organisms exhibit ID?
- Is ID more prevalent in some lines than in others?
- Are pathogens (AIDS, cholera, malaria etc.) due to ID?
- Examples of unintelligent design:
>99% of species extinct, photoreceptor orientation, laryngeal nerve, human appendix

Gene play, 1

Gene play: interaction and regulation of genes (epigenetics)

- *Species-specific genes* are rare (mouse 1%), so phenotype largely determined by other factors
- *Gene doubling* (yeast 25%) accelerates evolution: one gene maintains function, other gene free to evolve
- *Hox genes* control development (pac-6 in eye)
- *Transcription factors*: proteins that switch genes on and off; 1700 in humans, bind to many locations in genome
- '*Junk*' DNA (non-coding DNA; 50% in human) regulates nearby coding genes. Can speed up speciation thousand to million fold

Gene play, 2

Examples of rapid evolutionary changes through gene play:

2. Lake Victoria cichlids 500 species in 12,000 yrs;
[*Xenoleberis* shrimp unchanged in 425 million yrs.]
3. Titmouse behavior (active and timid) in small number of generations
4. Stickleback, marine form 35 body plates and 3 spines, lost in fresh water. Reverses in 2 generations.
Pitx-1 gene inactivated (not mutated) in fresh water

‘Irreducibility’ not quite irreducible, 1

1. Visual system, rhodopsin (opsin+retinaldehyde) present in receptors of all three eye types and as proton pump in *Halobacteria* (600 million yrs old). In Sargasso Sea microbes 782 opsin homologs (aminoacid changes)
3. Bloodclotting system consists of 12 factors in humans
Dolphin misses Factor XII, but clots.
Hagfish/lamprey primitive system with only 3 of the mammalian factors. So bloodclotting system evolved over at least 450 million yrs.

‘Irreducibility’ not quite irreducible, 2

1. Immune system, Immunoglobulin G (IgG)

Human IgG 4 chains, 2 light, 2 heavy, can produce millions of antibodies. IgG of camel has no light chains, can produce only few thousands. *Drosophila* has gene Dscam that can encode for 38,000 primitive antibodies

3. Bacterial flagellum: ring base of 10 proteins and tail of 20 proteins. Ring base identical with type III secretion system by which gram-negative bacteria secrete toxins into host cell.

Clear indications of evolution in all four systems. None are ‘irreducibly’ complex

Additional example: bacterial motility

Myxococcus xanthus moves as colony over solid nutrient medium by means of **pili**.

When gene for pili formation is destroyed, *M. xanthus* develops in 32 generations novel system: extracellular protein fibril matrix. Moves even faster.

Did Designer look over scientists' shoulders, then quickly design new motility system?

Theological aspects

- ID is not a scientific concept (untestable)
- ID is a metaphysical concept (beyond science)
- ID requires an Intelligent Designer, a Creator, making it a theological concept (contrary to Behe's claim)
- ID then becomes God-in-the-gap theology, God at the mercy of scientific advances. Theologically unacceptable
- Examples of 'unintelligent' design make God 'bumbling hobbyist', rather than 'superior engineer'

Creative Chaos

- Scientifically and theologically better to assume design at the beginning: physical laws and fundamental constants governing entire cosmic and biological evolution
- Capricious and ‘unintelligent’ course of evolution suggests **trial and error process** exploring all possibilities
- Achieves optimal endresult, unlikely to be reached by imposing ad hoc designs for each complex system
- God retains possibility to keep process on the rails by incidentally influencing a chaos event

Conclusions

1. 'Gene play' more flexible, faster than mutation/selection
2. Behe's examples not irreducibly complex and show signs of evolutionary development
3. No scientific basis for ID hypothesis
4. ID is theological, but a God-in-the-gap hypothesis
5. Design of entire creation is in physical laws and fundamental constants, which govern cosmic and biological evolution
6. Trial-and-error process assures optimal endresult

Problems of *creatio ex nihilo*

- Conceptual: cannot picture nihil --> ‘existing’ nihil
- Scientific: cannot work with nihil
- Biblical: no reference to nihil
- Theological: no satisfactory formulation of creation from nihil (Jürgen Moltmann)
- Theodicy: evil would be created by God (Satan is no solution: if under God’s control, God still responsible; if not, then dualism)

This leads me to a revised creation theology

“chaos theology”

Chaos Theology, 1

1. Initial creation from primordial chaos

biblical: Gen.1 and Gen.2

science: at $t = 0$ vacuum with quantum fluctuations

2. Continuing creation

biblical: Gen.1-11 full creation story;

Mk.13:19 ...*God created until now*

science: cosmic and biological evolution

Chaos Theology, 2

3. Remaining chaos

-In OT symbolized as 'sea'(22x); NT 8x

-God battles remaining chaos

-Rev.21:1 *sea was no more*: chaos abolished

4. Evil emerges from remaining chaos

-physical evil: earthquakes, hurricanes, disease, all chaotic

-moral evil: chaotic thinking

Avoids all five problems of *creatio ex nihilo*

Chaos theory: chaos events, 1

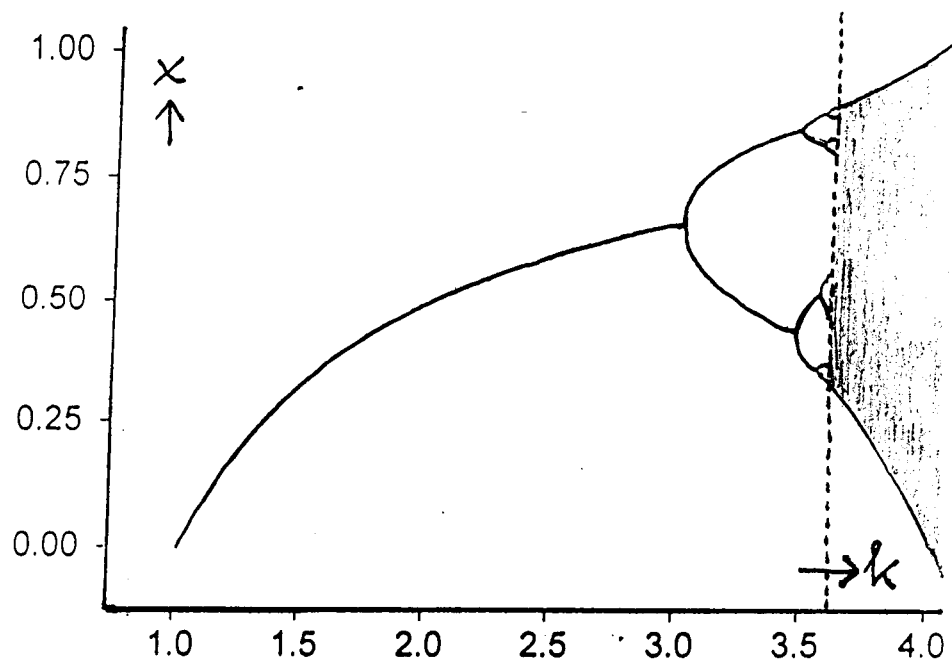
- Biological organisms, solar system, climate etc. obey non-linear dynamics in time, given by equation:

$$x_{n+1} = k \cdot x_n (1 - x_n)$$

- Example: reproduction of moth colony
 x_n is number of moths in generation n , x_{n+1} in next
($1 - x_n$) for starvation or disease in dense colony
 k may represent fertility, slowly increasing

Chaos theory: chaos events, 2

Fork at $k = 3.0$, two at $k = 3.45$, infinite at $k = 3.57$



Chaos theory: chaos events, 3

- No energy difference between legs, so equally likely
- System becomes unpredictable (chaotic)
- Influencing possible by 1 bit of information
- Observed in laboratory experiments:
 1. turbulent flow of He-3 by lowering temp. from 0.0010 to 0.0007 °K
 2. electron diffusion through semiconductor by adjusting voltage(only forcing into chaotic behavior)

Chaos theory: chaos events, 4

- Can God influence a chaos event?

$$\Delta E = \Delta I \times k_B \times T \times \ln 2 \quad \Delta E \times \Delta t = h$$

- Calculation: $\Delta E = 0.7 \times 10^{-21}$ gcal, $\Delta T = 10^{-14}$ °C

$$\Delta t = 2.0 \times 10^{-13} \text{ sec}$$

- Conclusion: it is possible, but will be undetectable for us (too small, too fast, moment not known)

Conclusions

- Chance: unable to explain direction to greater complexity
- Intelligent Design: faulty scientifically and theologically
- Creative chaos:
 - creation from initial chaos
 - phys. laws and fund. constants set boundaries
 - God allows freedom in a trial & error process of evolution speeded up by epigenetics
 - in crisis moments God influences a chaos event (e.g., asteroid exterminating dinosaurs, permitting mammalian development)

Further reading

Creation and Double Chaos

Fortress Press, Minneapolis, 2005

website:

www.chaostheologie.nl