Rolling the Dice

evolution, chance and design

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Darwinian Evolution

Descent with Modification

1. Start with some self-replicating simple organisms.
2. Copy them with slight variations.
3. Allow them to compete for food, shelter and mates.
4. Repeat 10 gazillion times.

- That is all we need to account for the staggering diversity and exquisite adapation of life on Earth.
- Genetics and molecular biology provide mechanisms for this process.
- With minor adjustments the theory of evolution by natural selection remains the basis of modern biology.

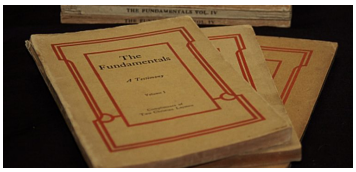
Objections to Evolution

1. It's just an automated procedure (an algorithm) and yet its results seem so creative and intelligent.

2. How can randomness lead to the solution of real-world problems in a reasonable amount of time?

3. Doesn't this theory undermine human dignity and the meaning of our lives?

Modern religious fundamentalism



Response to two developments in 19th century science.

1. Darwin's theory of evolution which did away with the idea that God was needed as a creator of life.
2. Modern Biblical scholarship which looked at the Bible as a collection of ancient literature and not as God's eternal and unchanging word.

How many monkeys would it take to write a novel?

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Not as many as you might think.

The Gambler's Fallacy

"I just flipped five heads in a row, so there must be a higher probability of tails coming up next."

The Hot Hand Fallacy

"Get her the ball quick, she is shooting way above her average today -- she is on fire!"

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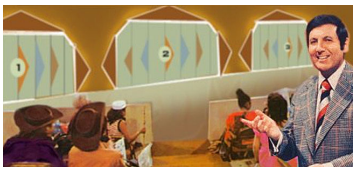
The Tough love Fallacy

When the team plays exceptionally well and I praise them afterwards, they don't play as well in the next game.

When the team plays really poorly and I scream at them in the locker room afterwards, they play better next time.

So positive reinforcement fails and negative reinforcement works.

The Monty Hall problem



Behind one door is a new car, behind the other two are goats.

- You picked door number one.
- Monty shows you the goat behind door number two.
- Should you switch to door number three when given the choice?

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