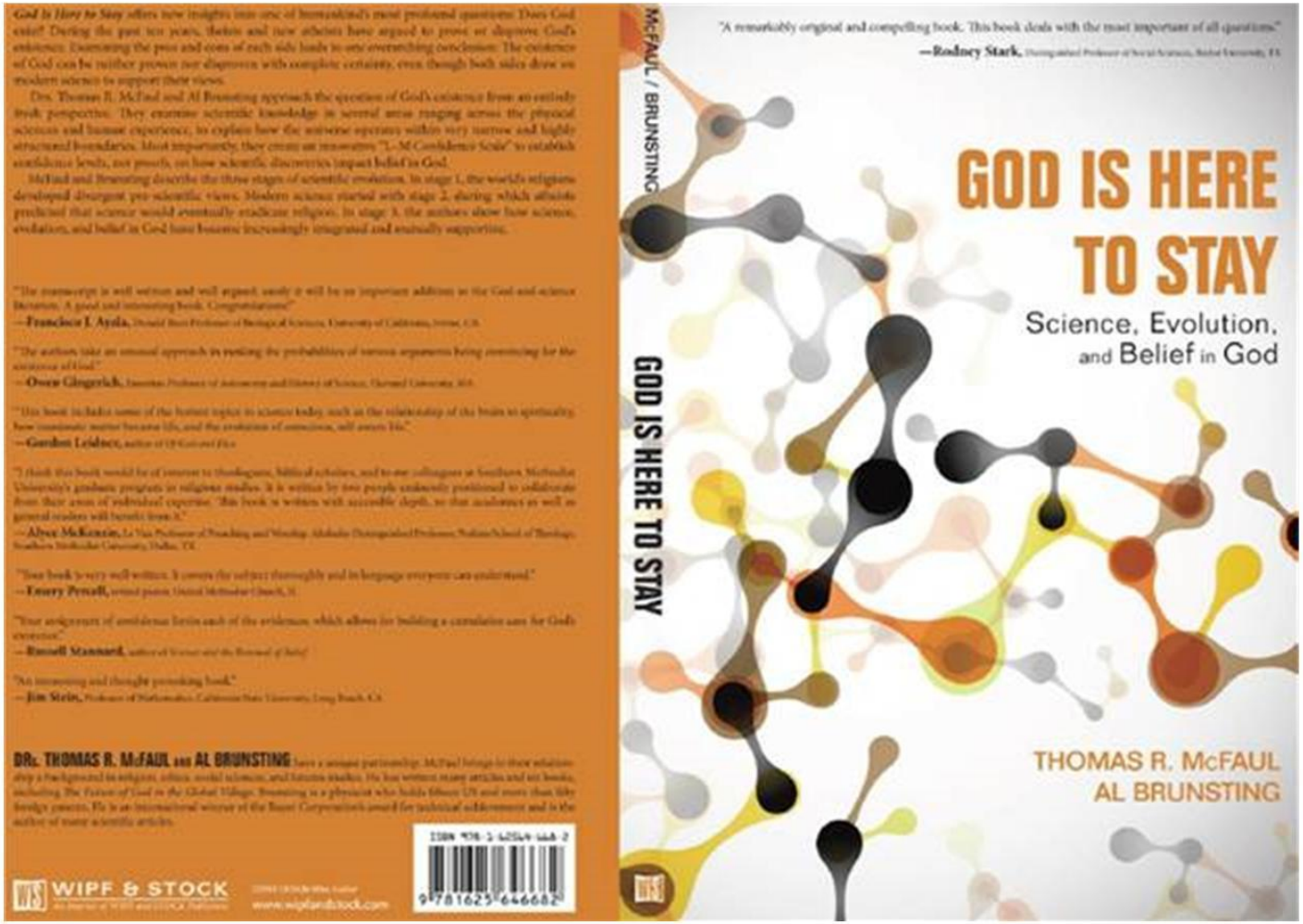
This is presentation 2 of 4. We'll discuss the main themes in this book:



Presenter: Al Brunsting
Feb. 11,'16

Fermilab Philosophical Society
Alexey Burov, Chair

From last week: **3 of 8 endorsers**

Name	Reason this person is an opinion leader	Quote
Francisco J. Ayala	2010 Templeton Prize winner and Donald Bren Prof. of Biol. Sci., U. of Cal., Irvine, CA.	"...well written & well argued, and surely it will be an important addition to the God-and-science literature. A good and interesting book. Congratulations."
Rodney Stark	Distinguished Professor of Soc. Sci. Baylor U. Author of 26 books on religion, sociology, & history.	"A remarkably original & compelling book. This book deals with the most important of all questions."
Jim Stein	Math. Prof., Cal. State, Long Beach, CA. Dr. Stein is a nonmilitant atheist.	"An interesting and thought –provoking book." [Author's note: Jim Stein conducted a 1 hr, live interview with me, available on-line.]

[I want to convince you that our themes likely have value for you.]

Does God exist? It might depend on your world view.

World view	Yes	No	Maybe	Not applicable
Rationalist			X	
Scientific				X
Humanist			X	
Materialist		X		
Deist	X			
Atheist		X		
Theist	X			
Agnostic			X	

We want an answer based on reality & not on whatever world view we might have.

To prove God's existence, independent of our world view, we have none of this:

- Convincing logical and/or rational proof (ch.1, p.7 – 15).
- Simulations, based on commonly accepted scientific understanding.
- Observations.
- Experimental results with analysis & conclusions.
- Peer reviewed theoretical conclusions.

It appears that an air tight proof is beyond our reach. Let's say that it is.

Where do we go from here, regarding "the most important of all questions" (Rodney Stark quote)?

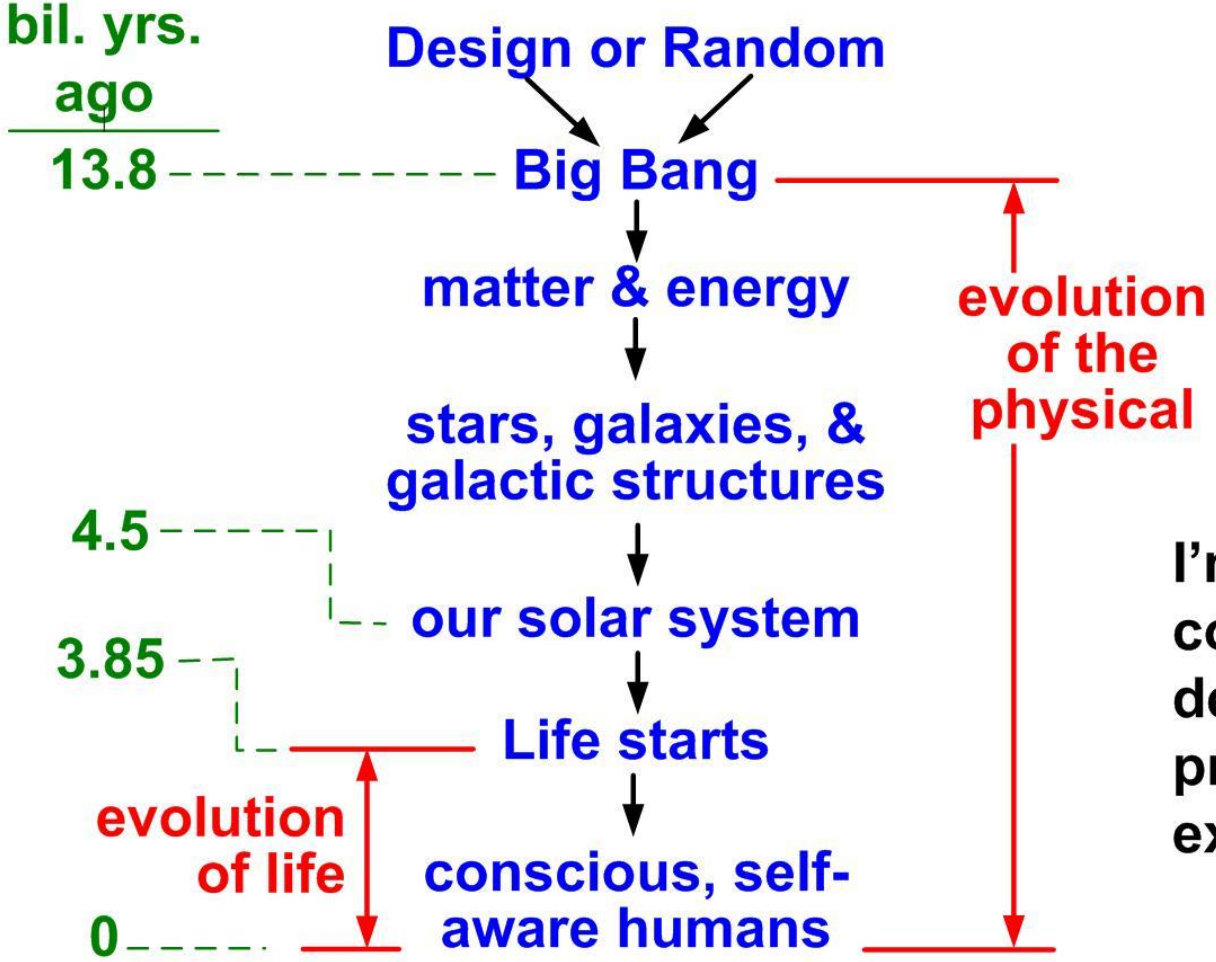
Here is our approach for where we go from here:

- Identify possible themes for God's existence (chapter titles).
- Determine which current & generally accepted conclusions within each theme are relevant.
- Examine current literature for disagreement and agreement.
- Examine relevant historical trends that relate to our estimates.
- Include both humanities and the sciences in our research.
- Make a quantitative estimate as independent as possible from our own world views.
- These numbers, by themselves, do not strengthen our conclusions. The numbers are only a communication tool.
- Encourage those who disagree to make their quantitative estimates for comparisons.

Today we summarize ch.3 “The Universe Is Structured for Conscious, Self-Aware life”

Where did all this come from?

2 basic explanations: Design or Random

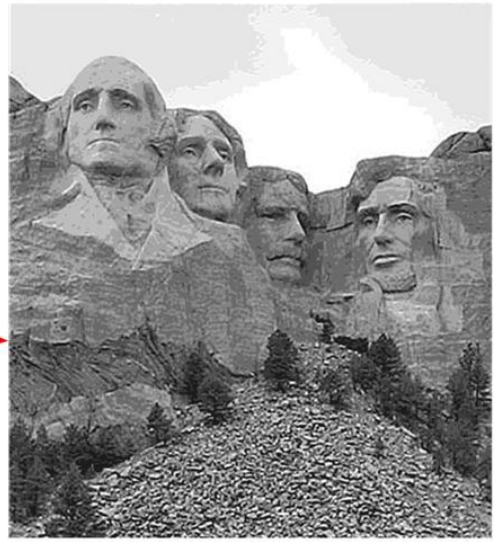


I'm going to contend that design is the preferred explanation.

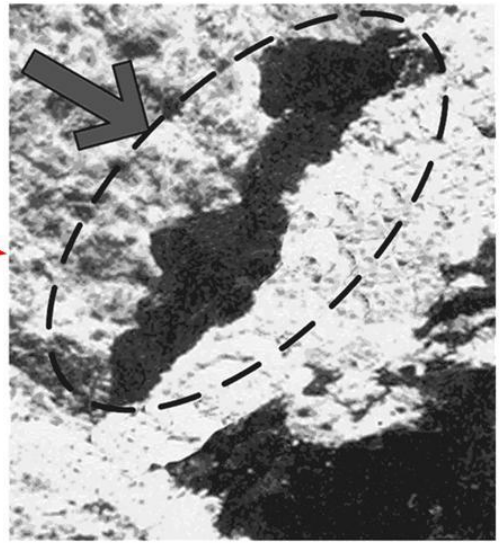
Design or randomness?

Let's look at examples rather than definitions.

Mount Rushmore, South Dakota, Nat'l Memorial.
4 US presidents: G.Washington, T.Jefferson, T.Roosevelt, & A.Lincoln.
Each smooth face is 60 ft. high.
Each 3D face is easily recognizable.
Carving was completed in 1941.



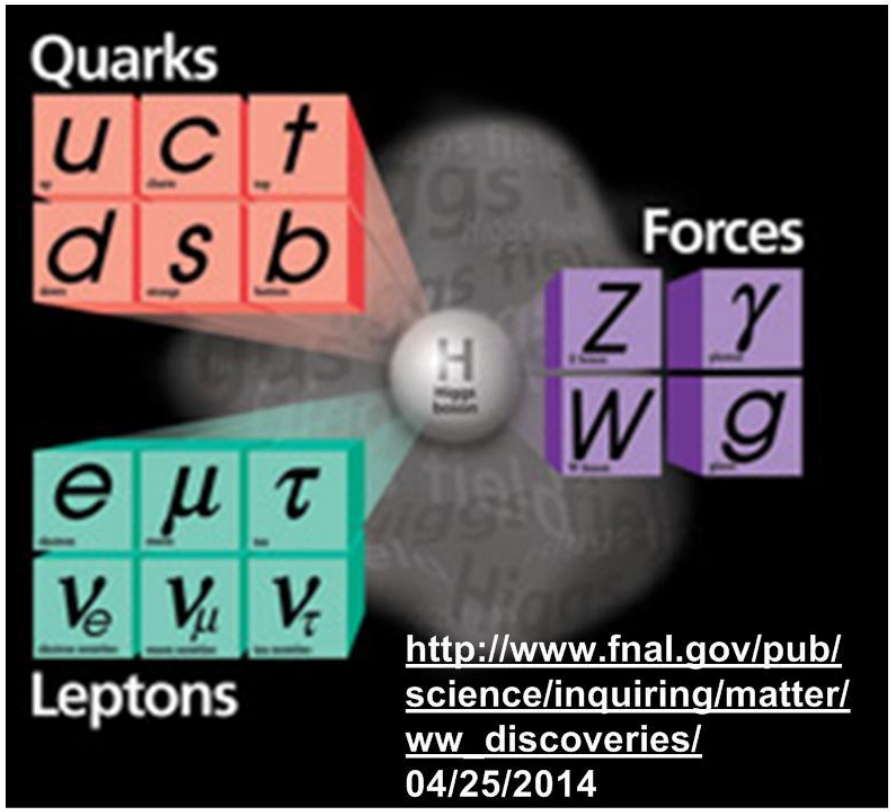
Lava rocks in Hawaii cast a shadow at certain time of day.
Shadow appears to be a silhouette of JFK.



Q: Which of these 2 examples appears to be a design & which appears to be the result of unguided, random processes?

The Standard Model

[Image is from Fermilab website.]



"The series of experimental and theoretical breakthroughs that combined to produce the Standard Model can truly be celebrated as one of the great scientific triumphs of the 20th century." [ref.5, p.47]

Fundamental mystery: Given the incomprehensibly vast and turbulent explosion/ inflation of the Big Bang, why is the Standard Model so simple and why does it have such broad application?

Why are there only 4 forces shown here plus gravity?

Anthropic Principle

What is it?

Natural law and associated constants apparently lead to the development of life (carbon based life, dependent on water). The universe has to be a very special place. I want to look at a few examples.

When was it proposed & by whom?

It was proposed in 1973 by astrophysicist and cosmologist Brandon Carter from Cambridge University.

[We will not distinguish between weak, strong, & other versions of the AP.]

Anthropic Principle (continued)

Summary

The laws of nature must take particular forms. Forces must have particular strengths. Very narrow margins (plus or minus ranges or windows) are allowable for these force strengths.

U.S. Dept. of Energy & Nat'l Sci. Foundation

"These processes had to be finely tuned to yield a universe capable of forming the galaxies, stars and planets we observe today. Did some undiscovered fundamental laws determine the conditions that allowed us to exist?"

Anthropic Principle & Gravity. Assume gravity was just 1% stronger or 1% weaker…

Stronger: Sun would burn out sooner, not enough time for self-aware life to develop. The sun would burn hotter. Too hot?

Weaker: Sun would burn cooler. Enough power incident on the earth of the right type?

Stronger or weaker: Solar system would develop differently. Would the right kind of planet develop in our Goldilocks zone?

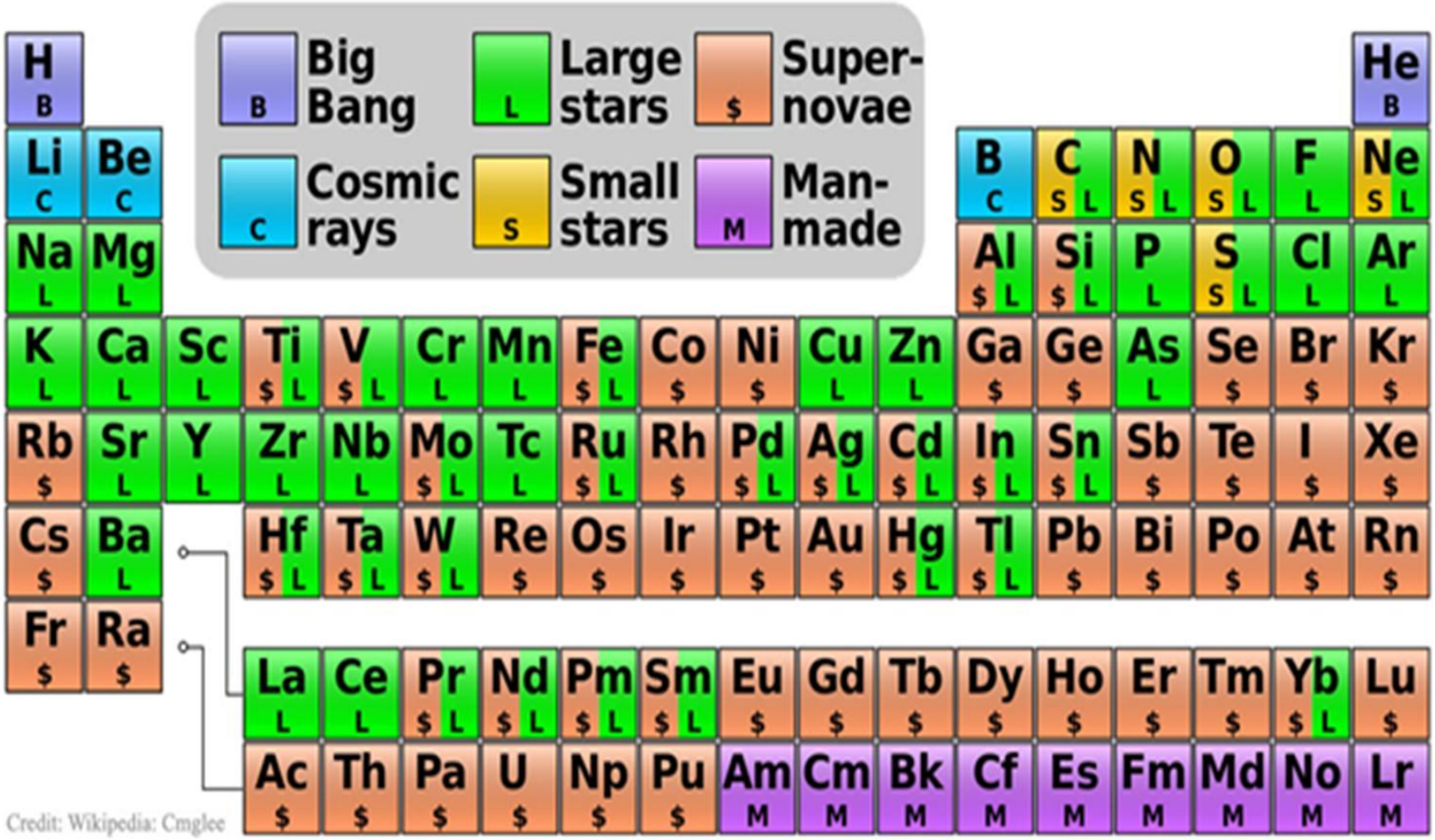
Stronger or weaker: The solar wind is different. Would the earth's magnetic shield be strong enough?

Stronger or weaker: Would the early atmosphere be conducive for origin of life & for sustainment of earliest forms of life?

Etc…

Would there be adequate heavy element development in 1st generation stars? [Next slide]

Ever wonder where your elements came from?



There has to be lots of gravity dependence here.

“The unreasonable effectiveness of mathematics."

In 1928, theoretical physicist Paul Dirac combined the math. for relativity and quantum mechanics into a single equation and predicted the existence of antimatter.

Prediction of anti-matter only from math.

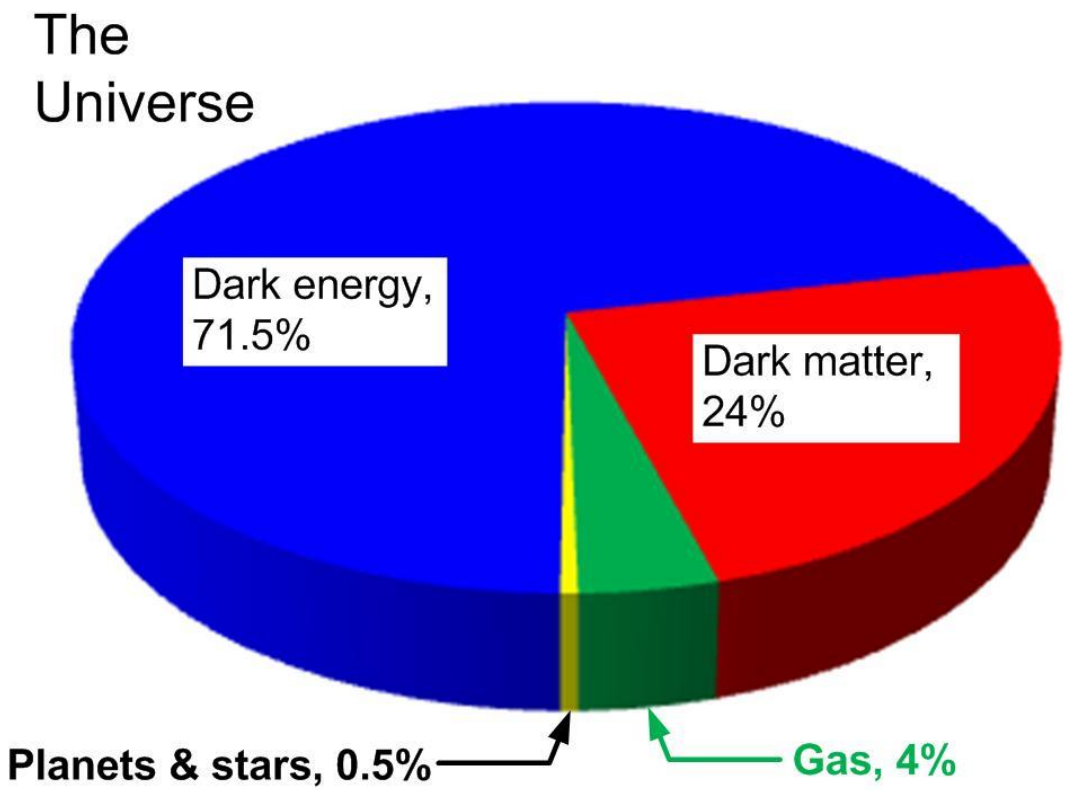
Antimatter was discovered as predicted.

Why should a math. equation — the product of brain chemistry — describe physical reality?

Why should there be any correspondence between math. and the laws of the universe?

Apparently elegant equations have predictive value for measured phenomena.

What we don't know > 95%



I contend this is an example of the need to consider the role of uncertainties.

Reference: National Geographic, April 2014, p.84

My contention: These 4 (of 19) examples seem more like design than random, unguided processes.

Description	If A	Result due to A	If B	Result due to B
Parent star age	If older	Luminosity of star would not be sufficiently stable.	If younger	Luminosity of star would not be sufficiently stable.
Parent star distance from center of galaxy	If greater	Not enough heavy elem. to make rocky planets (like earth)	If less	Stellar density and radiation would be too great.
Surface gravity	If stronger	Planet's atm. would retain too much ammonia & methane.	If weaker	Planet's atmosphere would lose too much water.
Ozone level in atmosphere	If greater	Surface temps. would become too low.	If less	Surface temps. would become too high, too much UV at surface.

Back of the envelope calculation

Assumptions: Each of 19 has 3 possible causes & origins: #1 predominately design, #2 predominately random & undirected, or #3 it just is.

Assume #1, #2, #3 all have equal probabilities, 0.33.

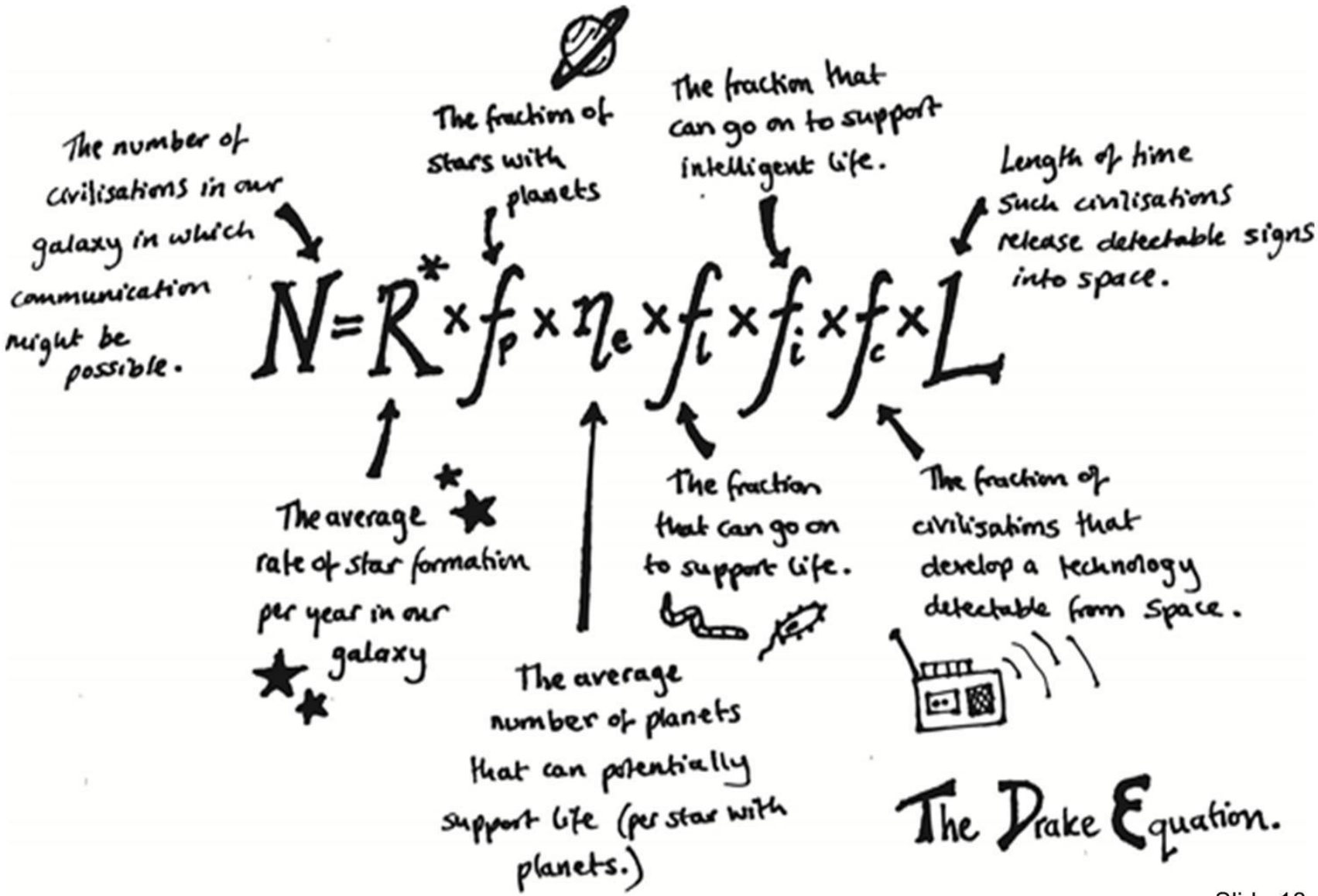
For the total package to be all random all 19 must be random. If 1 of the 19 is design, then the randomness claim evaporates.

For all 19: 0.33 X 0.33 X … [19 times] = 1 part in a billion chance for a random cause.

There are more than 19. The result is much smaller than 1 part in a billion.

Q1: Is this a large or small probability? Q2: What about the Drake equation?

The Drake equation



The Drake equation (continued)

Billions of galaxies, each with 100 million+ stars

2 opposing conclusions: #1 Prob. of random life development is very low. #2 The possible locations for random life development seem very high. Which dominates?

My thoughts:

- My guess: #2 dominates but it also has the largest uncertainty.
- We know more about the life-friendly factors. We know less about life-friendly locations.
- Due to our lack of knowledge f_L, f_i, f_c, & L factors all have very high uncertainties. In combination too high?
- Is the Drake equation complete? Is list of life-friendly factors complete?

Summary

	1. Probability of random life development	2. Possible locations for random life development	Favorable for design or randomness?
Overall probability	lower	higher	Randomness
Overall uncertainties	lower	higher	Design
Simplicity of std. model	N.A.	N.A.	Design
Simplicity & beauty of natural law	N.A.	N.A.	Design
Laws of nature seemed tuned for life	N.A.	N.A.	Design
Unreasonable effectiveness of mathematics	N.A.	N.A.	Design

As independent as possible from my world view, my conclusion is that the probability that the universe evolved conscious, self-aware life using a design is 95% & using only randomness is 5%.

Two weeks from today (talk 3) we'll discuss

The origin of life

How the brain might be structured for spirituality.

I hope to see you then.