

AN APOLOGETICS PRIMER: SCIENCE, WORLD VIEWS & CREATION

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Course Overview

AN APOLOGETICS PRIMER

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□ Defining the terms

- Apologetics: A must for disciples
- World views: Christian versus materialist

□ Examining the evidence

- Mathematics: Formal systems
- Physics: Quantum mechanics
- Cosmology: Big bang and anthropic universe
- Biology: Abiogenesis and speciation

□ Conclusions: creation vs. evolution

- Science restored: The heavens declare God's glory

3. Mathematics: Formal Systems

JUDGING WORLD VIEWS

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Theoretical View of Reality

- There is objective reality (ontology)
- Reality is knowable (epistemology)

3. Mathematics: Formal Systems

JUDGING WORLD VIEWS

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Practical Demands on this View

- True and real – i.e. practically testable
 - *experimentally conforms to reality*
- Logical – i.e. internally consistent
 - *cave: definition/meta vs. object plane*
- Complete – i.e. explains all of reality (space + time)
 - *matter-energy (properties of matter)*
 - *information (meaning, purpose, definition)*
 - *relation (relating, interactions, causality)*

3. Mathematics: Formal Systems

MODELLING NATURALISM

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Formal Systems (FS)

- Mathematical naturalism
- Principle: only closed systems regarded from within
- Fundamental: axiom minimisation
- Methodology of proofs: algorithms

attempt to prove
positivism
mathematically

b/c axioms
are external!

b/c algorithms
are mechanical!
(i.e. within system)

3. Mathematics: Formal Systems

MODELLING NATURALISM

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Formal Systems (FS)

- David Hilbert (1862-1943)
 - *language = formal tool for making proofs*
 - *goal: mathematical proof-making as “truth”-discovery entirely within closed formal (denominative) system without external inputs (= “formal proof theory”)*
- Ludwig Wittgenstein (1889-1951)
 - *boundaries of language = boundaries of world*
 - *mathematics = language-game*

3. Mathematics: Formal Systems

FORMAL PROOF THEORY

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Mathematical proof

- Proving truth of statements
- Euclid: basis of acceptance
 - 1) *the intuitively evident (axioms)*
 - 2) *logical derivation from axioms*
- Hilbert: “everything that is true can be proven by following rules”
 - *everything: universal validity*
(i.e. valid for entire material world)
 - *rules: using algorithms*
(i.e. pure iterative process - mechanical)
 - *also: maximum axiom reduction*

3. Mathematics: Formal Systems

FORMAL PROOF THEORY: **EVERYTHING?**

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Kurt Gödel (1906-1978)

- Statement of incompleteness (SOI: 1931)
 - “*in every consistent FS which is sufficiently rich for the arithmetic of natural numbers, statements exist which cannot be proven or disproven according to the rules of the system*”
 - => *not every true statement about reality is formally provable (i.e. via algorithm!)*
- Multiple reproofs since
 - e.g. Turing, Penrose
 - Breuer – without conditions

world>>language (FS)<<thought

3. Mathematics: Formal Systems

SOI: CONSEQUENCES

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Johann v. Neumann (1903-1957) 1931:

- “formal proof theory must be abandoned”
- the naturalistic experiment has failed

3. Mathematics: Formal Systems

SOI: CONSEQUENCES

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Alfred Tarski (1901-1983) 1969, 1971:

- meta- and object plane must be separated to properly define semantic concepts and to avoid paradoxical statements
 - e.g. *language*
 - e.g. *mathematics*
 - *liar's paradox*

“this sentence is false”

Concept of truth requires a meta-plane
existent outside the formal system
i.e. semantics (meaning) vs. syntax (relatedness)
e.g. natural numbers (Plato), axioms

3. Mathematics: Formal Systems

SOI: ALL OF REALITY?

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Peres & Zurek 1983

- The problem of universally valid theories (UVT)
- UVT conditions
 - *valid for entire system*
 - *system is deterministic*
 - *system experimentally verifiable*
- Problem: self-reference of internal observer
 - *part of system!*
- Contradiction: free choice of experiment and determinism
- => UVT not completely accessible to experimentation!!

i.e. describing all of
physical universe

3. Mathematics: Formal Systems

SOL: ALL OF REALITY?

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Breuer, 1997

- Causality, determinism, experiment
 - “A measurement from within a system is never capable of unequivocally determining or distinguishing all states of a system. This statement is true independently of time and also within the framework of deterministic systems.”
- => Practical knowability always limited within a naturalistic framework!!

3. Mathematics: Formal Systems

JUDGING NATURALISM AS A WORLD VIEW

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Quality of naturalism as a world-view...

- Ontology
 - *claims! - inadequate structure of reality*
- Epistemology
 - *all of reality never knowable*

3. Mathematics: Formal Systems

JUDGING NATURALISM AS A WORLD VIEW

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Quality of naturalism as a world-view...

- True?
 - *limited concept of/incomplete access to truth about reality*
- Logical?
 - *contradictions/paradoxes*
 - *due to non-separation of meta- and object planes*
- Complete?
 - *incomplete (vs. information, relationships)*
 - *partial theoretical/practical access to reality*

Naturalism as modelled by formal systems is an inadequate world view

3. Mathematics: Formal Systems



JUDGING WORLD VIEWS: SUMMARY

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	<i>Naturalism</i>	<i>Holism</i>
<i>Ontology</i>	Restricted reality	Unrestricted reality
<i>Epistemology</i>	Restricted by definition: no external observer possible	Restricted for immanent observer; unrestricted via transcendent revelation
<i>True?</i>	No (incomplete) (Breuer, Gödel)	Yes (Totality of reality)
<i>Logical?</i>	No (no definitional plane) (Tarski)	Yes
<i>Complete?</i>	No (matter-energy only) (Breuer/Peres)	Yes

**Naturalism as
modelled by
formal systems
is an inadequate
world view**

4. Physics: Quantum Mechanics

JUDGING WORLD VIEWS: EXPERIMENTAL EVIDENCE

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Theory: An adequate world view

requires a transcendent plane

Practice: Is this demonstrably

true experimentally?

Example 1:

Quantum mechanics (QM)

requires higher dimensions

4. Physics: Quantum Mechanics

BACKGROUND

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Four fundamental forces in modern physics

- electromagnetic (EM)
- gravitational (GR)
- weak nuclear (WN)
- strong nuclear (SN)

based on concept of discrete finite mass (particles) and energy (packets) states

e.g. for EM proton/electron with positive/negative charge

highly successful prediction of experimental results

to date successful unification in one quantum mechanical model of EM-WN-SN, but not GR

4. Physics: Quantum Mechanics

BACKGROUND

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Achieving a unified QM model

- electromagnetic, weak nuclear, strong nuclear force merged into one model
- so far, gravitation resists successful/convincing inclusion
- unification only achieved by use of higher-dimensional mathematics
- higher dimensions = **transcendence**

4. Physics: Quantum Mechanics

BACKGROUND

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Achieving a unified QM model

- all integrated models include concepts incompatible with classical naturalism
- singularities/discontinuities
 - *black holes/projection postulate*
- non-localisation/simultaneousness
 - *particle linkage/communication*
- measurement problems
 - e.g. Schrödinger's cat/observer problems

4. Physics: Quantum mechanics

QM AND NATURALISM

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incompatible
with naturalistic
world view!

Projection postulate

- Schrödinger equation (theoretical, mathematical use; higher dimensionality): deterministic
- wave packet reduction (i.e. use for physical reality, 3D + time): probabilistic
- problem of decoherence: superimposed incompatible states, non-real states

Schrödinger
equation

$$i\hbar(\delta/\delta t) |\Psi\rangle = H |\Psi\rangle$$

4. Physics: Quantum Mechanics

SCHRÖDINGER'S CAT

[video cat](#)

SCHRÖDINGER'S CAT

In 1935 Schrödinger published an essay describing the conceptual problems in QM.

"A cat is penned up in a steel chamber, along with the following diabolical device (which must be secured against direct interference by the cat): in a Geiger counter there is a tiny bit of radioactive substance, so small that *perhaps* in the course of one hour one of the atoms decays, but also, with equal probability, perhaps none; if it happens, the counter tube discharges and through a relay releases a hammer which shatters a small flask of hydrocyanic acid. If one has left this entire system to itself for an hour, one would say that the cat still lives *if* meanwhile no atom has decayed. The first atomic decay would have poisoned it. The Psi function for the entire system would express this by having in it the living and the dead cat (pardon the expression) mixed or smeared out in equal parts.

It is typical of these cases that an indeterminacy originally restricted to the atomic domain becomes transformed into macroscopic indeterminacy, which can then be *resolved* by direct observation. That prevents us from so naively accepting as valid a "blurred model" for representing reality. In itself it would not embody anything unclear or contradictory. There is a difference between a shaky or out-of-focus photograph and a snapshot of clouds and fog banks.

We know that superposition of possible outcomes must exist simultaneously at a microscopic level because we can observe interference effects from these. We know (at least most of us know) that the cat in the box is dead, alive or dying and not in a smeared out state between the alternatives. When and how does the model of many microscopic possibilities resolve itself into a particular macroscopic state? When and how does the fog bank of microscopic possibilities transform itself to the blurred picture we have of a definite macroscopic state?"

4. Physics: Quantum Mechanics

QM AND NATURALISM

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incompatible
with naturalistic
world view!

Observer problem

- von Neumann 1932: wave packet reduction
is effect of observer's consciousness
- Observer: QM applicable or not?
- Observer: fully external or internal?
- If internal observer, no full experimental accessibility
if QM universally valid
 - self-reference, cf. Peres & Zurek, Breuer

4. Physics: Quantum Mechanics



QM AND NATURALISM

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incompatible with
naturalistic world view!

Measurement problem

- Non-real states before measurement takes place
 - i.e. *is the cat dead or alive – or somewhere in between*
- Measurements of the first kind
 - i.e. *measurement prepares a state*
 - N.B. *classically, measures are retrospective!*
- Non-locality and information transfer
 - e.g. *radioactive decay to separated particle pairs – with paired characteristics*
 - e.g. *Heisenberg's principle and electrons orbiting protons*

imply existence of transcendence –
with different laws

5. Cosmology: Anthropic universe

JUDGING WORLD VIEWS: EXPERIMENTAL EVIDENCE

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Theory: An adequate world view

requires a transcendent plane

Practice: Is this demonstrably
true experimentally?

Example 2:

***Cosmology requires transcendent
superintelligence to explain origin and
existence of our anthropic universe***

5. Cosmology: Anthropic universe

JUDGING WORLD VIEWS: EXPERIMENTAL EVIDENCE

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“Weak Anthropic Principle (WAP): the observed values of all physical and cosmological quantities are not equally probable but take on the values restricted by the requirement that sites exist where carbon-based life can evolve and by the requirement that the Universe be old enough for it to have already done so.”

“Strong Anthropic Principle (SAP): the Universe must have those properties which allow life to develop within it at some stage in its history.”

The Anthropic Cosmological Principle, John Barrow and Frank Tipler, p. 16, 21

5. Cosmology: Anthropic universe

ANTHROPIC PRINCIPLE

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The Anthropic Principle was proposed in Poland in 1973, during a special two-week series of synopsia commemorating Copernicus's 500th birthday. It was proposed by Brandon Carter, who, on Copernicus's birthday, had the audacity to proclaim that humanity did indeed hold a special place in the Universe, an assertion that is the exact opposite of Copernicus's now universally accepted theory.

In addition to the WAP and SAP, there are the Participatory and Final Anthropic Principles. The Participatory Anthropic Principle states not only that the Universe had to develop humanity (or some other intelligent, information-gathering life form) but that we are necessary to its existence, as it takes an intelligent observer to collapse the Universe's waves and probabilities from superposition into relatively concrete reality. The Final Anthropic Principle states that once the Universe has brought intelligence into being, it will never die out. These two are also very speculative.

Source: http://www.physics.sfsu.edu/~lwilliam/sota/anth/anthropic_principle_index.html

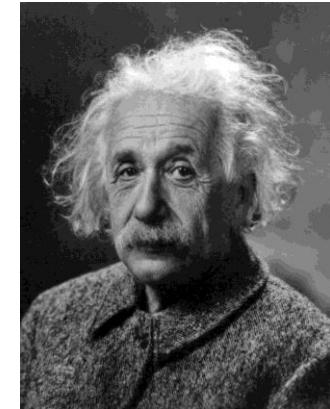
5. Cosmology: Anthropic universe

THEORY OF RELATIVITY

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Relativity theory

- Proposed by Albert Einstein (1879-1955)
- 4-dimensional space-time is curved
 - explains gravitational effects
 - in what dimension?
 - allows for different speeds of time
 - basis for black holes (Hawkins, Penrose)



5. Cosmology: Anthropic universe

DEFINITION: RELATIVITY THEORY

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Relativity theory

- Physics. A theory, formulated essentially by Albert Einstein, that all motion must be defined relative to a frame of reference and that space and time are relative, rather than absolute concepts. It consists of two principal parts.
- The theory dealing with uniform motion (**special relativity**) is based on the two postulates that physical laws have the same mathematical form when expressed in any inertial system, and the velocity of light is independent of the motion of its source and will have the same value when measured by observers moving with constant velocity with respect to each other.
- Derivable from these postulates are the conclusions that there can be no motion at a speed greater than that of light in a vacuum, mass increases as velocity increases, mass and energy are equivalent, and time is dependent on the relative motion of an observer measuring the time.
- The theory dealing with gravity (**general relativity**) is based on the postulate that the local effects of a gravitational field and of acceleration of an inertial system are identical.

5. Cosmology: Anthropic universe

STRUCTURE OF SPACE-TIME

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Law of thermodynamics

- Any of three principles governing the relationships between different forms of energy.
- The **first law of thermodynamics** (law of conservation of energy) states that the change in the internal energy of a system is equal to the sum of the heat added to the system and the work done on it.
- The **second law of thermodynamics** states that heat cannot be transferred from a colder to a hotter body within a system without ~~net changes occurring in other bodies within that system;~~
in any irreversible process, entropy always increases.
- The **third law of thermodynamics** (Nernst heat theorem) states that it is impossible to reduce the temperature of a system to absolute zero in a finite number of steps.

5. Cosmology: Anthropic universe

DEFINITION: ENTROPY

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en·tro·py

1. For a closed thermodynamic system, a quantitative measure of the amount of thermal energy not available to do work.
2. A measure of the disorder or randomness in a closed system.
3. A measure of the loss of information in a transmitted message.
4. The tendency for all matter and energy in the universe to evolve toward a state of inert uniformity.
5. Inevitable and steady deterioration of a system or society.

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5. Cosmology: Anthropic universe

DEFINITION: COSMOLOGICAL CONSTANTS

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Cosmological constants

- Values are known for observable universe
- 5 kinds of constants (20 total)
 - space-time (*min. space, time, energy, mass; max. velocity*)
 - energy-forces (*GR, SN, WN, EM*)
 - individuation (*EM: rest mass proton/electron, unit charge*)
 - large-scale/fine-structure (*total mass of universe, Boltzmann, Hubble, cosmological, cosmic photon/proton ratio, permittivity of free space, EM fine-structure, WN fine-structure, GR fine-structure*)
- Critically/ultimately define structure and function of universe
 - determine whether universe could support life (anthropic universe)

5. Cosmology: anthropic universe

HISTORY OF THE UNIVERSE

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vs. naturalistic
world view!

creatio ex nihilo!

Big bang theory

- Universe began as a singularity
 - all inflationary universes start with a singularity,
i.e. a boundary to past time which is reached in finite time
 - BVG theorem (Borde, Vilenkin, Guth 2003)
 - proven postulate/deduction
- Universe subsequently expanded
 - observation
- Very early period of very rapid stretching
 - observation, e.g. cosmic background radiation
 - very low entropy at end of this period (measured)!
- Now ongoing slower/slowing expansion
 - observation, e.g. red shift

5. Cosmology: Anthropic universe

QUESTIONS

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Relativity and big bang theory

- Where did the singularity come from?
 - how did space-time come about?
 - how did matter-energy come about?
 - why did it expand?
- Where did the necessary information come from?
 - for the defining arbitrary cosmological constants?
 - to end-up with an early low-entropy universe?
- What defines the relationships and keeps them operating?
 - e.g. qualitative and quantitative characteristics of physical forces?

5. Cosmology: Anthropic universe

NEED: A TRANSCENDENT+SUPER-INTELLIGENT CAUSE

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God is necessary for modern cosmology...

- Because the universe had a beginning
 - the universe is now observed to be FINITE in mass and time
 - the history of the universe started with a singularity
- Because of the second law of thermodynamics
 - low entropy states very improbable
 - entropy increases with time
- Because an anthropic universe is highly unlikely
 - the anthropic range of cosmological constants is very small
 - for an anthropic universe the cosmological constants need fine-tuning

low entropy and anthropic constant states EXTREMELY unlikely by chance
(i.e. “nature”), thus need for transcendent cause of physical reality

5. Cosmology: Anthropic universe

THE TRANSCENDENT+SUPER-INTELLIGENT CAUSE

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How unlikely...

- Low-entropy condition/compatible with 2nd LoTD (Roger Penrose)
 - ratio of total phase-space volume of possible universes for a creation event VS. phase-space volume of our anthropic universe
 - ratio reflects necessary accuracy of the Creator in phase space to achieve a low-entropy world necessary for anthropicity
 - = 1 in $10 \exp 10 \exp 123$ (10 to the power of 1 with 123 zeros after it)
- Anthropic cosmological constants (Paul Davies)
 - variations in gravitational or weak force constants of less than 1 in $10 \exp 40$ results in non-anthropic universe
 - consequences of non-adherence: catastrophic explosion or collapse, no clustering of matter and no complex structures (life!)

5. Cosmology: Anthropic universe

THE TRANSCENDENT+SUPER-INTELLIGENT CAUSE

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How unlikely...

- Anthropic cosmological constants (Brandon Carter)
 - variations in strong force constants of more than 2% result in non-anthropic universe
 - consequence of non-adherence: all hydrogen converted to elements heavier than hydrogen OR no element heavier than hydrogen
- Carbon atom resonances (Owen Gingerich, Fred Hoyle)
 - dependent on cosmological constants
 - coincide perfectly with those of beryllium, helium, oxygen
 - necessary for carbon-based life
 - carbon resonance 4% lower = essentially no carbon formed
 - carbon resonance + 0.5% = virtually all carbon converted to oxygen

5. Cosmology: Anthropic universe

SUMMARY: THE TRANSCENDENT+SUPER-INTELLIGENT CAUSE

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Evidence for necessity of transcendent....

- universe began with a singularity a finite time ago (BVG)
- 2nd law of thermodynamics (2LoTD)

Evidence for necessity of super-intelligent transcendent cause of physical reality...

- fine-tuned low entropy state of universe
(to conform with 2LoTD)
- narrow range of individual anthropic cosmological constants
- fine-tuning of cosmological constants vs. each other for anthropic universe

5. Mathematics, Physics, Cosmology

CONCLUSIONS

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- **The necessity and existence of transcendence and a super-intelligent transcendent being is obvious to any unbiased observer and researcher**
- **The existence of the transcendent and the properties of the transcendent super-intelligent being - as observable in general revelation - challenge us to think about and explore transcendence and to seek contact with the super-intelligent being!**

5. Mathematics, Physics, Cosmology



THE BIBLE'S VIEW

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Psalm 19:1-3

19 The heavens declare the glory of God; And the firmament showeth his handiwork.

2 Day unto day uttereth speech, And night unto night showeth knowledge.

3 There is no speech nor language; Their voice is not heard