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The Mind of God. Paul Davies

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Deductive Logic — Conclusions are a MUST.

Inductive Logic → Very Probable.

- * Physical Laws are based on Generalisations - ∴ induction
- Mathematical Laws - Sequential arguments based on axioms
- * Inverse Square Law - highly probable - laws tested next time, but not necessarily a must.

Conclusions arrived at inductively are never absolutely secure in the logical manner of deductive conclusions even though "Common Sense" is based on induction.

That inductive logic is the successful way to be characterized as the "dependability of nature"

xxx We all go through life holding the beliefs about the world (such as the inevitability of Sun rise) which are inductively derived and considered to be wholly reasonable and yet rest not on deductive logic, but on the way the world happens to be.

∴ the world could have been otherwise.

INSPIRATION — Neither inductive nor deductive.

quite a bit of scientific advancement is due to inspiration.

Causality and Determinism.

Chance. (are the forces hidden?)

Q.M. — { Indeterminacy built into it (1920's)
Heisenberg's Principle of Uncertainty.

Recent Experiments have confirmed that Quantum Uncertainty is indeed intrinsic — The universe is indeterminate at its most basic principle.

This does not mean the universe is irrational.

Probabilities are still determined. Statistical laws imply

|| That on a macroscopic scale when quantum effects are usually not noticeable, nature seems to conform to deterministic laws

Job of physicist: Uncover the patterns in nature and fit them to simple mathematical schemes

Meta-physic: Why are there patterns? Why mathematics

↓
Original - that which comes "after physics"
Now → Beyond physics.

↓ Origin, nature and purpose of the universe.
Observable and Reality.
Relation between mind and matter.
existence of free will.

David Hume:

18th Century - EMPIRICISM

↓
Meaning can be attached only to those ideas that stem directly from observations of the world or deductive schemes of mathematics.

Concepts like Reality, mind, substance lie beyond our senses they are unobservable. He rejected PURPOSE or MEANING of the universe or Manhood's place in it - NOT OBSERVABLE.

KANT

Knowledge from Experience + innate knowledge that necessary for any thought process.
Sense Data + a priori knowledge

↓
We can apply our reasonings to "things we see". This can tell nothing about "things in themselves" -

Recent developments -

(i) Fundamental physics (ii) Cosmology, (iii) Computing theory
 delinked in metaphysical types

AI \rightarrow Free Will and Mind Body problem.

QM - Observer and Observed.

Chaos theory - Relationship between permanence and Change
 is Complex.

Theory of Everything (TOE) - all physical laws could be
 unified into a single mathematical
 scheme.

Why one type of law, Why math, Other Intelligent observer?

meta-physics \rightarrow theory about the theory of physics

I think, therefore I AM.

Thinking is a process Being is a State

When I think, my mental State changes with time.

But the "me" to which the mental State refers
 remains the same.

Our Primary Experience is 'ourselves' }
 we also perceive the external world. }

The external world changes

Being \rightarrow Becoming

Being + Becoming = Existence.

Search for the most ENDURING ASPECTS OF EXISTENCE.

What is absolutely Constant?

Material and physical \rightarrow Abstract and Mystical.

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What is the Relation between the Changing and the Unchanging?
(Experienced) (Abstract)

PLATO: True Reality → transcendent world - Unchanging
Perfect, Abstract ideas or Forms - a
domain of mathematical relationships
and fixed geometric structures.

The Changing world of our direct experience, he regarded
as fleeting, ~~eph~~ ephemeral and illusory (the
World of becoming)

Material objects = Shadow or P shadow of the World of Forms.
(the Cave Scenario) -

PLATO invented two Gods to have dominion over the two worlds
Forms - "Good" - an eternal immutable being beyond
Space and time

"Demiurge" - whose task was to fashion existing
matter into ordered state, using Forms
as template or blue print. But being
less than perfect, this fashioned world is
continually disintegrating and in need of
creative attentions of the Demiurge.

Timeless and Eternal - Ultimate Value.

ARISTOTLE (i) Rejected the timeless Forms.

Student of
PLATO

(ii) The world is a Living Organism developing
like an embryo towards a definite goal.
Cosmos infused with PURPOSE.

(iii) Souls guided living things. But the Souls are
immanent in the living things themselves,
not transcendent in the Platonic sense.

(iv) ∴ gave primacy to becoming than Being.
(v) No beginning in Time. for the Universe

vi The Universe Contained "Ingenerated, imperishable and eternal" heavenly bodies that moved for ever along fixed and perfect circular orbits.

Principle of Sufficient Reason:

- * Scientific Enterprise is built on the assumed Rationality of Nature.
- * Theologians believe in a Rational God.

Physical Universe: Mostly Contingent - It could be otherwise depending on something else.

Necessary: There are necessary things in the universe.
A necessary thing can make no reference to time

What about (i) the universe - it could have been otherwise.

(ii) Laws of Nature. - NECESSARY (?)
dependable on progress of time.

|| Some Scientists think that there will be a time when all laws will be combined into a single mathematical scheme and this will be the ONLY logically self-consistent one.

Drive towards Convergence - Super-Unification

TOE - Many Scientists think that this is feasible.

Rational || There is a graspable logic behind everything || BARROW
 Cosmos. || That can be compressed into a compelling and succinct form.

But is it UNIQUE?

Deductive Logic

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The World, it is said, would be explained:

NEWTON'S LAW, Maxwell's LAW, Einstein's Gravitational LAW —
all the rest would follow inexorably from the Requirement of
logical consistency as sure as ~~the~~ Pythagoras'
theorem follows from axioms of Euclid's Geometry.

If so, science would be empirical, but a
branch of Deductive Logic. With the Laws of
Nature requiring the Status of Mathematical Theorems,
and properties of the world deducible by applications
of Reasons alone.

Stephen Hawking → "Is the End in Sight for Theoretical Physics"

Theoretical Physics → Toy Universe models dependent on
Mathematical models. - Cellular Automata
Contingent on - Theory of Necessity, Symmetries, dimension of
Space etc.

Axioms of Mathematics - have to be justified from outside
of math.

Different Axioms can lead to different logical schemes.
+ Gödel's Incompleteness.

Barrow: There is no formula that can deliver all the truth,
all harmony, all simplicity.
No TOE can ever produce total insight.

Laws of physics + INITIAL CONDITIONS

+ Quantum
Uncertainty.

rules out Uniqueness.

Contingent order

- * Mendel's laws of genetics though consistent with underlying laws of physics, cannot be derived from the laws of physics
- * Similarly, various laws and regularities found in chaotic systems or self-organizing systems depend not only on the laws of physics but also on the specific nature of the system
- In many cases, the behaviour depends on accidental microscopic fluctuations - undetermined in advance.
- ∴ Above the laws of physics

Q: What breathes fire into the equations that encode the laws of physics promoting merely possible to ACTUAL?

↓ *Simplicity, Beauty, Elegance*

SCIENCE IS A DIALOGUE WITH NATURE.
NATURE'S INFORMATION IS IN CODE.

EINSTEIN: "Nature is the realization of the simplest conceivable mathematical ideas"

BARNUM: "It is enigma enough that the world is described by mathematics — mystery within the enigma is the simplicity"

Beauty: Many Scientists believe that Beauty is a reliable guide to Truth.
Many advances in physics are based on the demand for ELEGANCE - Dirac's theory

Does the Structure and Operation of the Brain dictate that is pleasing to the eye and ear?
Is Beauty Biologically programmed?

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If beauty is programmed for biological value, why
does it turn up in the esoteric world of mystics?
Or is it a reflection of something more fundamental?