



Starting Science From God

2: Discrete Degrees

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A series of four evenings

- Feb 5: Connecting Science and Theism (chs. 1, 3)
- **Feb 12: Discrete Degrees (chs. 4, 5)**
- Feb 19: Explaining Theism (Part III)
- Feb 26: Applications to Theistic Science (Part V)
 - I talk for 45 mins (answering shorter questions).
 - Refreshment break for 15 mins
 - Discussion for 45 mins (for longer questions)

2. Discrete Degrees

OUTLINE

Better idea of 'substance'?

- Realistic basis need for all kinds of things
- The power/propensity/dispositions of objects
- Concept of mental substance

Better idea of 'multiple degrees' of existence?

- Like 'dimensions' or 'planes', but better
- Examples from physics
- Examples from psychology
- General principles: generation & selection
- See connections between levels

Both ideas came from using Swedenborg to understand modern science!

Particular conclusions to remember: see the ★ sign

A. Bad ideas of mental substance

- Matter (materialists, physicalists)
- Rationality (Descartes)
- Immaterial Form (Aquinas)
- Information (Bohm?)
- Pure Being (nondualists)
- Quantum vacuum (Laszlo)
- Consciousness (what does it do?)

Substance, Form, and Dynamics

Back to basic analysis:

- There are three categories of terms in science:
 - formal terms
 - about the structure & static properties of what exists now
 - existential terms
 - about what exists, what is. Is it unknown?
 - dynamical terms
 - about what would happen, in new and/or hypothetical conditions.
 - Only by dynamics, can we make predictions.

Three Categories: more examples

Form

- shape, number, form, relation, configuration,
- function, field, oscillation, wave, flow, vibration
- point, length, area, volume, amplitude,
- vector, matrix, Hilbert space,
- ratios, probability, relative frequency.

MATHEMATICS

Existence

- particle, material, matter, corpuscle, body,
- fluid, ether,
- substance, actuality, reality,
- experience, observation,
- world, universe.

ONTOLOGY

Dynamics

- cause, propensity, power, disposition, capability,
- energy (kinetic and potential),
- mass, charge, field coupling,
- force, pressure,
- momentum, impetus, elasticity/rigidity.

PHYSICS

All three categories are needed, in order to describe:
What exists, Its Form and Its Behavior. ★

Three Categories: more examples

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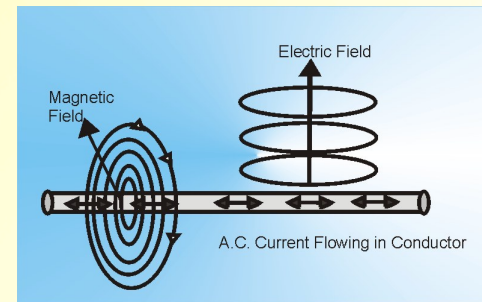
What exists, Its Form and Its Behavior. ★

New idea: 'Dynamic substance'

- Try to derive 'existence' from 'dynamics':
- Substance of a thing is its propensity (to do some thing) ★

- Examples:

- 'electromagnetic force field',
- 'potential energy field'
- 'matter is a form of energy'
- quantum wave function is a 'propensity field'
 - propensity to interact, or
 - propensity to choose actual outcome



- Remember: propensities still present even if not acting ★
 - Do not need to know more 'existence' than this.
 - Maybe not *that* original!
 - Aristotle and Newton used something similar

Mental Substances (minds)


Works for minds too:

- Not something 'we know not what'!
- **Mental substances are the propensity for mental actions**
- That is: loves, desires, etc. are mental substance ★
- Even materialists (eg Gilbert Ryle) agree that 'minds are dispositions'.
 - but now we take them as real substances.
- Agrees with Swedenborg that 'Love is the substance of man' ★

DLW43: "Divine Love and Divine Wisdom in themselves are substance and form"

Bad ideas of mental substance

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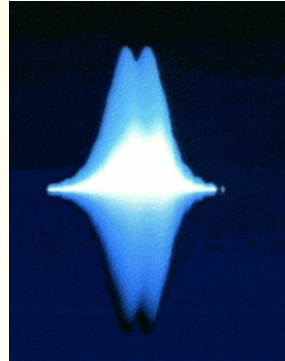
Why? 

Quantum Physics

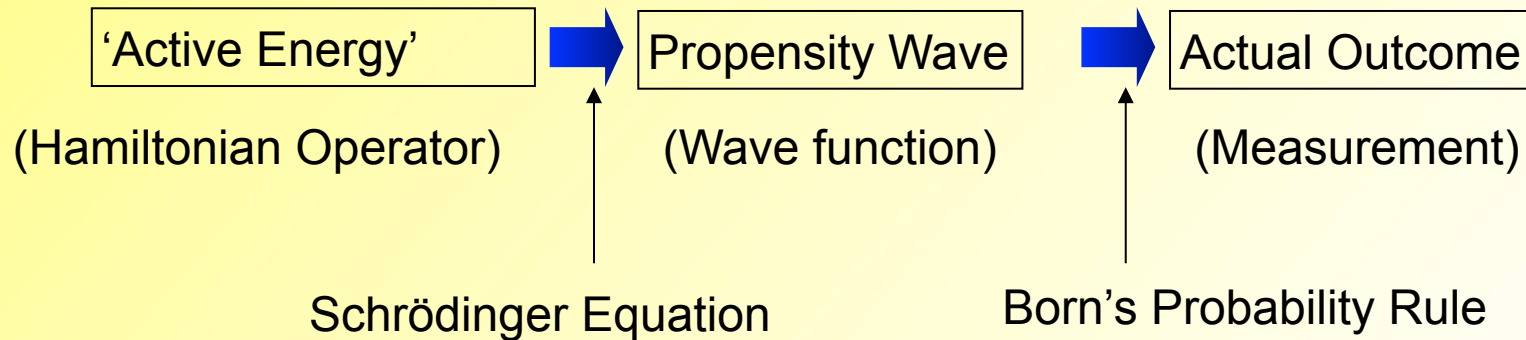
- There are probabilistic (random) events.
 - From a wave function spread out in space
 - Wave function from an equation about energy

Now:

- the wave function is the form of propensity
 - The propensity for probabilistic events
 - That propensity is substance of quantum objects★
- No particles, only ‘waves of propensity’ ★
- The propensity is the substance, wave is the form



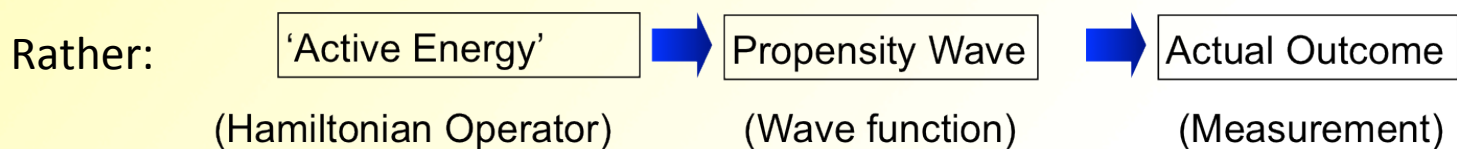
Two stages in Quantum Mechanics



1. Propensity wave generates the actual measurement
 - according to Born's Probability Rule for $|\psi|^2$
2. Actual measurements = selections of alternate histories
3. Energy operator generates the wave function,
 - according to Schrödinger's time-dependent equation
4. So: 'Energy', 'propensity waves' are two kinds of propensity ★
5. Neither are mental propensities! ★

Bad ideas about Quantum Physics


- Shut up and calculate (physicists)
 - No reality
- Physics just for actual outcomes, not reality (Bohr)
 - No propensity or substance
- Parallel universes (Everitt)
 - No actual outcomes
- Hidden classical particles (Bohm)
 - Quantum waves are not substances
- Selection by consciousness (Wigner)
 - Propensities are for selections. But maybe 'when'?



B. Multiple 'degrees' of existence

- Show new concept for how minds and matter are (a) separate and (b) interrelated !
- **Later:** use concept to show how God and creation are (a) separate and (b) interrelated !
- This idea comes from Swedenborg
 - New illustrations from physics & psychology

How Mind and Matter related?

1. Matter causes mind only? $\text{matter} \Rightarrow \text{mind}$
 - Epiphenomenalism or dual-aspect physicalism
2. Mind causes matter only? $\text{mind} \Rightarrow \text{matter}$
 - ‘new age’ or ‘we create our own reality’
3. Mind and matter in parallel? $\text{mind} \uparrow \uparrow \text{matter}$
 - Pre-established harmony: Leibniz. Correspondences?
4. Mind and matter interact $\text{mind} \leftrightarrow \text{matter}$
 - Descartes (Body \leftrightarrow Soul)
 - Causes in both directions, but not in same way 
 - Swedenborg (many discrete degrees)

Degrees in Galileo's experiment

Remember how a ball rolling down a hill is accelerated by gravity (Galileo's experiment)

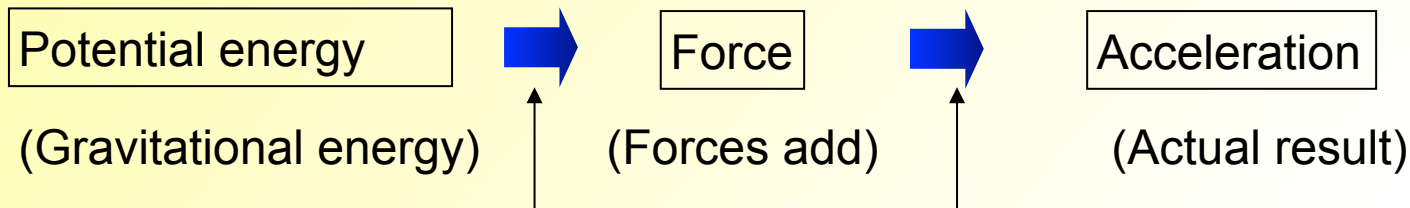
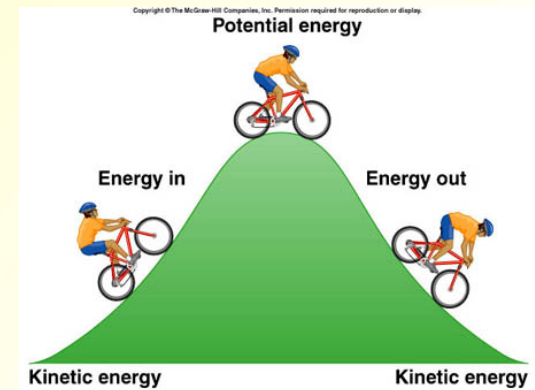
Newton's second law: $F=ma$

- So: acceleration (a) = force (F) / mass (m)
- But: acceleration is present only if mass is there!
- So: force = disposition to accelerate a mass (if finite mass present)
- Presence of inertial mass is occasion for motion, but not principal cause



Multiple degrees in Newton's physics

- Ball rolling down a hill is accelerated by gravity
- Gravitational energy:
 - Force depends on the slope
 - Changes in gravitational potential energy produce the force ★



Newton's Law of Gravity

Newton's Second Law $F=ma$

Again, we see two stages of the operation of propensities.

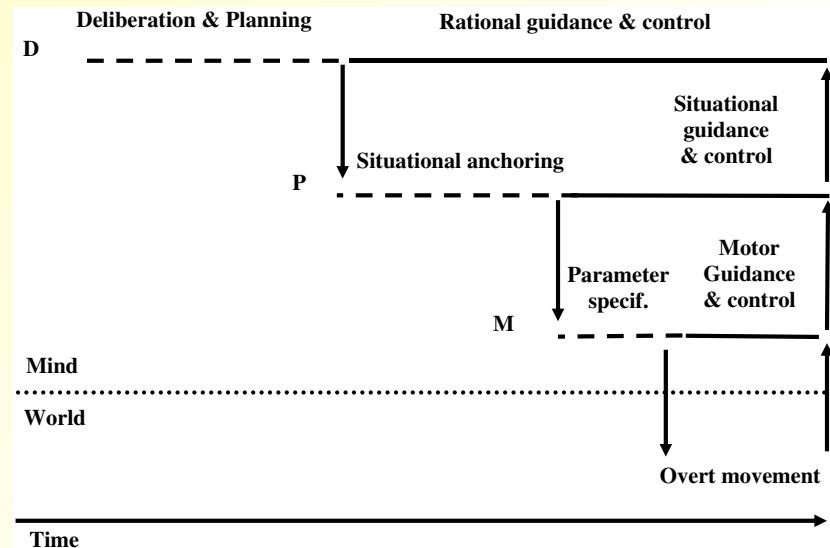
Multiple degrees in psychology

- In deliberate control of hand movements
 1. Deliberate (rational) intentions (D)
 2. Monitoring of moving hand, by eyes (P)
 3. Control of muscles (M)

Psychologists make theories about:

“Cascading Intentions” ★

D → P → M → overt action



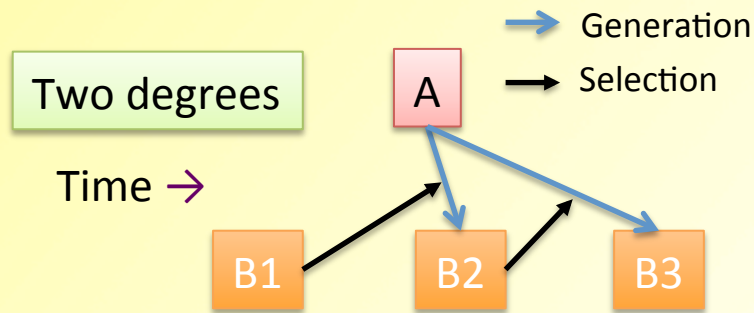
Recognizing Discrete Degrees

- Quantum mechanics:
 - Energy → Propensity → Actual Selections
- Classical physics
 - Potential energy → Forces → Acceleration
- Psychology of motor control
 - Plan → Guidance → Motor impulse → Physical act
- All these are example of **Discrete Degrees** ★

Principles of 2 Discrete Degrees

Consider: $A \rightarrow B$

- A generates further existence of B
- Which new B is generated by A , and is selected by previous B



Imagine
A=our mind, or God
B=physical effects

- Twin processes of generation and selection ★
 - Generation is from the 'higher' degree: 'principal cause'
 - Selection is from the 'lower' degree: 'occasional cause'
- With only two degrees like here, we have 'occasionalism'
 - For God, this is philosophy of Nicolas Malebranche (1638-1715)
 - An attempt to understand God-world relations.

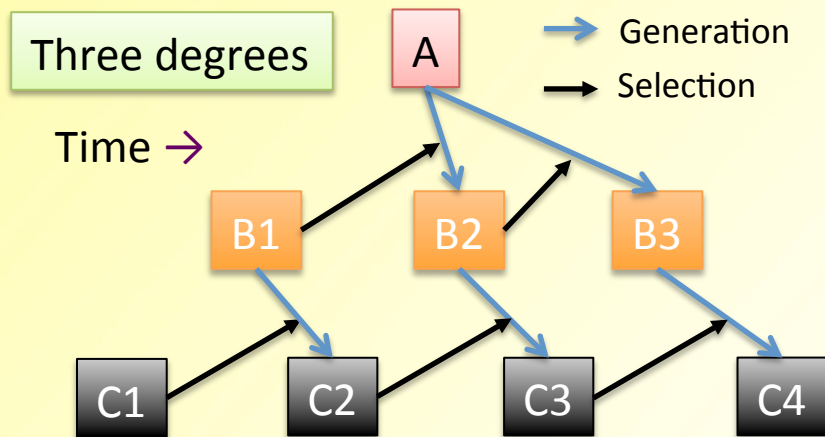


Principles of 3 Discrete Degrees

Consider: $A \rightarrow B \rightarrow C$

A: God
B: Minds
C: Effects

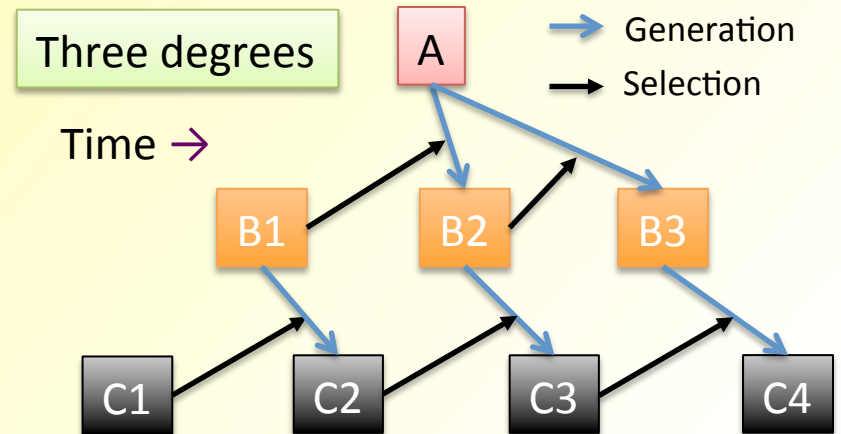
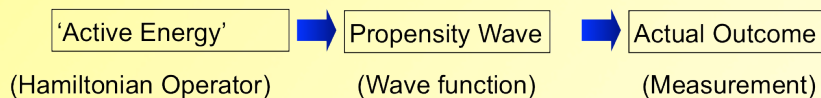
- A generates further existence of B , and B of C
 - Which new B is generated selected by previous B ,
 - Which new C is generated selected by previous C .



Examples of 3 Discrete Degrees

Have from quantum physics

- A: principle / energy
- B: distribution / form
- C: final effect



Just like in the mind:

- A: desire
- B: thinking
- C: action

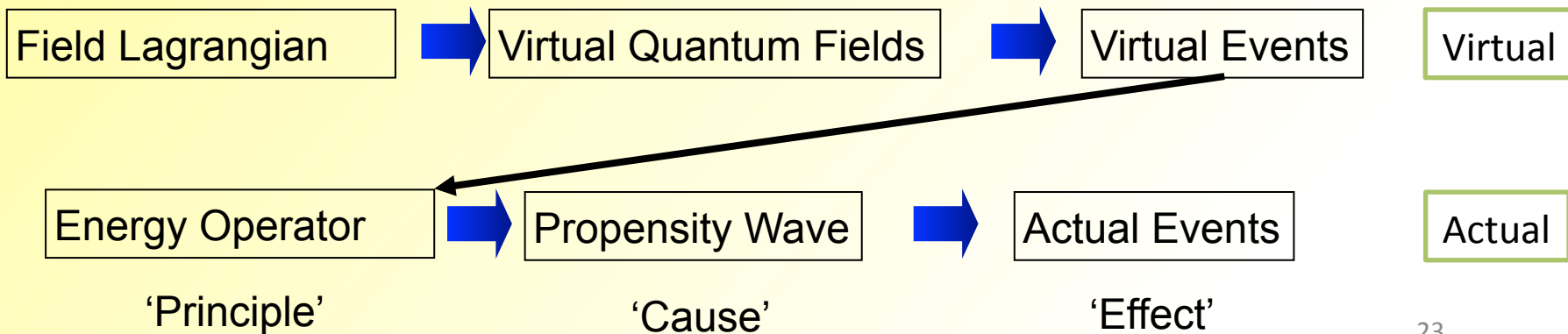
Similar processes of generation & selection are in minds, and in nature 🌟

Each degree has

- own being
- own space
- own existence

Quantum Field Theory: Propensities for Virtual Processes

- TWO linked sets each of three generative levels
 - both with (broadly) corresponding processes,
 - i.e. still in pattern ‘Energy ➡ Wave ➡ Effect’.
- Virtual processes (in some way) ‘generate’ the terms of the Energy Operator: the Hamiltonian. (Kinetic & Potential E)



More complex structures of discrete degrees should be expected ★

Preview of Third Talk (Feb 19)

- Good concepts of God
 - Not metaphorical, or hidden from science
 - Being itself, Life itself, Love itself, Wisdom itself
- Understanding how we derive from God
 - God is being, love, wisdom & life itself
 - We derive being, love, wisdom, life from God
 - How?
 - By ‘generation and selection’, in discrete degrees

End