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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)

- 1 talk for 45 mins (answering shorter questions).
- Refreshment break for 15 mins
- Discussion for 45 mins (for longer questions)

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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](#)

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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?)

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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.

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Three Categories: more examples

Form	Existence	Dynamics
<ul style="list-style-type: none"> • shape, number, form, relation, configuration, • function, field, oscillation, wave, flow, vibration • point, length, area, volume, amplitude, • vector, matrix, Hilbert space, • ratios, probability, relative frequency. 	<ul style="list-style-type: none"> • particle, material, matter, corpuscle, body, • fluid, ether, • substance, actuality, reality, • experience, observation, • world, universe. 	<ul style="list-style-type: none"> • cause, propensity, power, disposition, capability, • energy (kinetic and potential), • mass, charge, field coupling, • force, pressure, • momentum, impetus, elasticity/rigidity.
MATHEMATICS	ONTOLOGY	PHYSICS

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

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Three Categories: more examples

<p>Form</p> <ol style="list-style-type: none"> 1. shape, number, form, relation, configuration, 2. function, field, oscillation, wave, flow, vibration 3. point, length, area, volume, amplitude, 4. vector, matrix, operator, Hilbert space, 5. ratios, probability, relative frequency. <p style="text-align: center; font-size: small;">MATHEMATICS</p>	<p>Existence</p> <ol style="list-style-type: none"> 1. particle, material, matter, corpuscle, body, 2. fluid, ether, 3. substance, actuality, reality, 4. experience, observation, 5. world, universe. <p style="text-align: center; font-size: small;">ONTOLOGY</p>	<p>Dynamics</p> <ol style="list-style-type: none"> 1. cause, propensity, power, disposition, capability, 2. energy (kinetic and potential), 3. mass, charge, field coupling, 4. force, pressure, 5. momentum, impetus, elasticity/rigidity. <p style="text-align: center; font-size: small;">PHYSICS</p>
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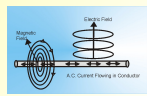
All three categories are needed, in order to describe:
What exists, its Form and its Behavior. ☼

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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

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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"

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Bad ideas of mental substance

- Immaterial Form (Aquinas)
- Rationality (Descartes)
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Why? ☼


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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



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Two stages in Quantum Mechanics

'Active Energy'

(Hamiltonian Operator)

Propensity Wave

(Wave function)

Actual Outcome

(Measurement)

↑

Schrödinger Equation

↑


Born's Probability Rule

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! ☼

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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'?



Rather: Active Energy (Hamiltonian Operator) → Propensity Wave (Wave function) → Actual Outcome (Measurement)

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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

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How Mind and Matter related?

- Matter causes mind only? matter ⇒ mind
 - Epiphenomenalism or dual-aspect physicalism
- Mind causes matter only? mind ⇒ matter
 - 'new age' or 'we create our own reality'
- Mind and matter in parallel? mind ⇕ matter
 - Pre-established harmony: Leibniz. Correspondences?
- Mind and matter interact mind ⇄ matter
 - Descartes (Body ↔ Soul)
 - Causes in both directions, but not in same way ☹
 - Swedenborg (many discrete degrees)

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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)

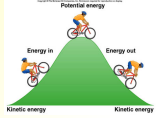
Presence of inertial mass is occasion for motion, but not principal cause



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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 ☹



Potential energy (Gravitational energy) → Force (Forces add) → Acceleration (Actual result)
 Newton's Law of Gravity Newton's Second Law $F=ma$

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

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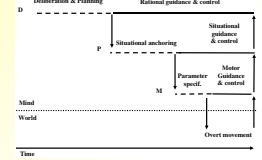
Multiple degrees in psychology

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

Psychologists make theories about:

"Cascading Intentions" ☹

$D \rightarrow P \rightarrow M \rightarrow$ overt action



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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** ☺

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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

- 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.

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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.

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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

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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 ☺

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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

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