

Progress and Purpose (part 2)

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O Creator ineffable, who of the riches of Thy wisdom didst appoint three hierarchies of Angels and didst set them in wondrous order over the highest heavens, and who didst apportion the elements of the world most wisely: do Thou, who art in truth the fountain of light and wisdom, deign to shed upon the darkness of my understanding the rays of Thine infinite brightness, and remove far from me the twofold darkness in which I was born, namely, sin and ignorance. Do Thou, who givest speech to the tongues of little children, instruct my tongue and pour into my lips the grace of Thy benediction. Give me keenness of apprehension, capacity for remembering, method and ease in learning, insight in interpretation, and copious eloquence in speech. Instruct my beginning, direct my progress, and set Thy seal upon the finished work, Thou, who art true God and true Man, who livest and reignest world without end. Amen.

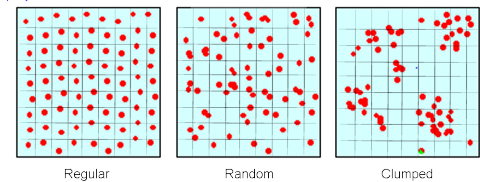
(St. Thomas Aquinas *Oratio ante studium*)

Randomness Is Not a Chance

- Scientism posits randomness, not final causes, as the origin of nature's tendency to order.
- Mere measurement cannot discern order from disorder.
 - Only understanding motion can.
- “Chance is an equivocal word”
 - Philosophical physics' usage:
 - It's “an aberration from a motion's final destiny.”
 - Empiriological physics' usage:
 - Chance is not about motion, but quantity.

Randomness Is Not a Chance

- Randomness in mathematics
 - Random has a statistical meaning
- Mathematics doesn't study chance ∴ mathematics does not study final causes.
- True chance is something physical, not mathematical.
- Random follows law; chance is lawless.

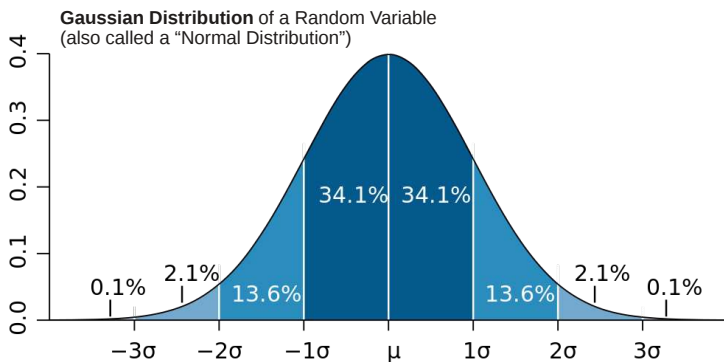


Regular

Random

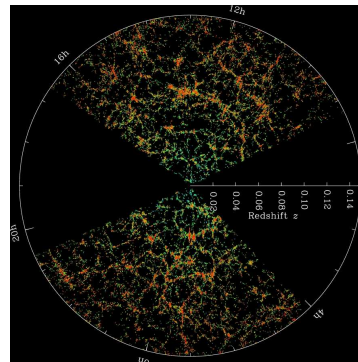
Clumped

Randomness Is Not a Chance



Randomness Is Not a Chance

Is this distribution of galaxies random?

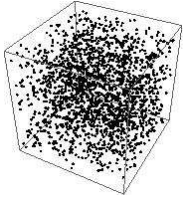


- Sloan Digitized Sky Survey (SDSS) distribution of galaxies
- Studied by a telescope in New Mexico (*below*)

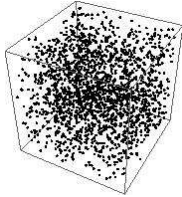


Randomness Is Not a Chance

- How does a computer, which operates by determined algorithms, generate a random number?
- Answer: It doesn't. A computer can only generate so-called pseudo-random numbers.

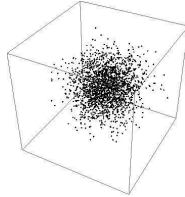


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7



Statistics Implies Determinism

- Statistical wholes are ordered.
 - E.g., (# heads)/(# tails) after many tosses of a coin.
- How can the whole be ordered when it is apparently comprised of disordered parts?
 - Answer: The parts must follow a law.
 - If the parts were completely chaotic and lawless, then "no order like averages, radioactive half life, and thermal equilibrium would occur in the whole."
- "Order does not depend for its existence on our ability to measure it."
 - Order has nothing to do with quantity; it has to do with nature's tendencies toward ends.

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8

The Heisenberg Principle Implies Order

- Schrödinger's wave equations of quantum mechanics determine the time-evolution of the *probability* of positions and energies.
 - "The probability in premises is connected with the probability in the conclusions by order and by law."
 - The equations describe the time-evolution of probabilities because physicists do not have an exact knowledge of the equation's initial conditions ("premises").
 - Hence, Heisenberg's Uncertainty Principle (HUP) forces physicists to study probabilities.

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9

The Heisenberg Principle Implies Order

- Does the HUP imply a disorder in nature or a lack of our understanding?
 - Viz., is it an ontological or epistemological uncertainty?
- Proof that it's epistemological:
 - There exists a standard of order with which to judge something disordered.
 - If the standard is objective, all is determinate in the world.
 - If it's subjective, so is the indeterminism it defines.
 - Thus, logical indeterminism (epistemological uncertainty) is the cause of the HUP.

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10

True Chance is Real

- Francis Bacon: "Chance reflects man's ignorance more than nature's aberrations."
- Man's knowledge is of universals; only God can know all there is to know about individuals.
 - ∴ for God, nothing happens by chance.
- Two type of ignorances:
 - Negative: ignorance in matters of physical chance
 - This **cannot** be overcome by, e.g., more careful study.
 - Privative: lack of knowledge that could be attained
 - This lack **can** be overcome by, e.g., more careful study.

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11

Empiriology Rightly Tends toward the Chance-like

- Theories are tools to predict experiments.
 - They should not have metaphysical or ontological presuppositions.
- Is nature really completely deterministic?
 - Yves Simon: "[T]he more an atom is divided the more parts there are and the more likelihood there is of interferences among causal series."
- More matter is split, the more inertial it becomes.
 - "Their form in poor and their final cause is weak."

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12

Entropy Would Forbid Motion

- Law of entropy provides directionality for movements in the universe.
- Law of entropy is a substitute for final causality in empiriological physics,
 - ∴ it says ordered things tend toward disorder.
- That entropy increase is a flawed view of motion.
 - Act doesn't seek potency; potency seeks act.
 - A cow doesn't seek a plant to become a plant but to become a more perfect cow.

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14

Nature Has a Counterpart to Entropy

- A body moving locally tends to its natural place of rest.
- Empiriological physics considers such an equilibrium as randomness.
- The empiriological physicist “attains to a ‘mechanical equivalent’ of the order which the philosophy of nature sees as the end of motion.”

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15

Control is Art, not a Science of Nature

- Chance and art are extrinsic to nature.
- “If chance is defined as the result of factors extrinsic to a given nature, it draws up alongside art, and if empiriological physics is primarily an art, it would be logical to seek a world of chance as its ideal subject matter.”

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16

References

- V. E. Smith's *Philosophical Physics*
 - Please finish reading ch. 8 (Progress and Purpose).
 - We will send out a scanned PDF of this required reading.
- Further reading:
 - Aquinas, Thomas, *Summa contra gentiles*, Bk. III, chs. 1-24.
 - von Mises, Robert, *Probability, Statistics, and Truth* (New York, 1932).

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A.M.D.G.

17