Do we really live in a nondeterministic world?

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Temple of Tyche
“... we must consider that the Providence of God, as taught in Scripture, is opposed to fortune and fortuitous causes. By an erroneous opinion prevailing in all ages, an opinion almost universally prevailing in our own day — viz. that all things happen fortuitously, the true doctrine of Providence has not only been obscured, but almost buried.”

John Calvin
Institutes 1.16.2
God's providence is his almighty and ever present power, whereby, as with his hand, he still upholds heaven and earth and all creatures and so governs them that leaf and blade, rain and drought, fruitful and barren years, food and drink, health and sickness, riches and poverty, indeed, all things, come to us not by chance, but by his fatherly hand.
“We may regard the present state of the universe as the effect of its past and the cause of its future. An intellect which at a certain moment would know all forces that set nature in motion, and all positions of all items of which nature is composed, if this intellect were also vast enough to submit these data to analysis, it would embrace in a single formula the movements of the greatest bodies of the universe and those of the tiniest atom; for such an intellect nothing would be uncertain and the future just like the past would be present before its eyes.”
Neils Bohr
Randomness does not have a univocal definition – it denotes a family of related concepts.
A popular definition of randomness

Not having a governing design, method, meaning or purpose; without order; without cause or control.
Scientific definitions

- Unpredictability (mathematics)
- Without cause (physics)
- Following laws of variation (statistics)
- Irreducible, without pattern, unpredictable (computer science)

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- Uncorrelated with environmental opportunities (biology)
My central question for today:

Is the randomness we observe only apparent or is it a property of the physical world?
Why do I not want to use quantum mechanics in answering?

At the quantum level, space, time, and causality are deeply mysterious.
Poisson processes

Properties:
• Events occur in time at a constant rate
• Equally likely at any time
• Each occurrence is independent of each other occurrence

My favorite example:
• Cosmic ray detection
Time between occurrences

Frequencies
Is cosmic ray detection random?

• Each particle moves under deterministic laws of motion.
• Particles are independent; even if you knew the precise arrival time of the first n particles, you would have no information that would help you predict the n+1st.
• Hence arrival times are random.
Thus, randomness is a necessary property of human experience of cosmic ray detection (and more).
Two models of God’s interaction with the physical universe:

- Occasionalism
- Thomism (every creature is a causative agent in its own right)
So from Thomism I infer indeterminacy. Why?

A list of arrival times would not exhibit a pattern. Thus it is random even to God.

No one exercises direct control over the particles. Hence the randomness is indeterminacy.
Note that:

This assertion affects how we understand divine sovereignty. Indeterminacy here does not mean that anything can happen – rather it means freedom within constraints.

This perspective on God’s role is similar to the notion of simple foreknowledge.

Unlike quantum uncertainty, this randomness is a property of systems not individual entities.
Conclusions

The conjunction of the propositions that:

a) An infinite, omniscient, omnipotent God created the vast diversity of living and non-living creatures on earth.

b) God used a means that took an estimated 13.8 billion years and that incorporated indeterminate processes.

seems incredible to many folks. Many unbelievers deny a); many believers deny b).
Why might God have made the world via b)?

For the sheer joy of it.

Because of a high regard for human stewardship.