

for Friday Freethinkers - Notes for Discussion

Chapter 3

The Causal Potency of Patterns

I Am a Strange Loop

March 26, 2007 by Douglas R. Hofstadter



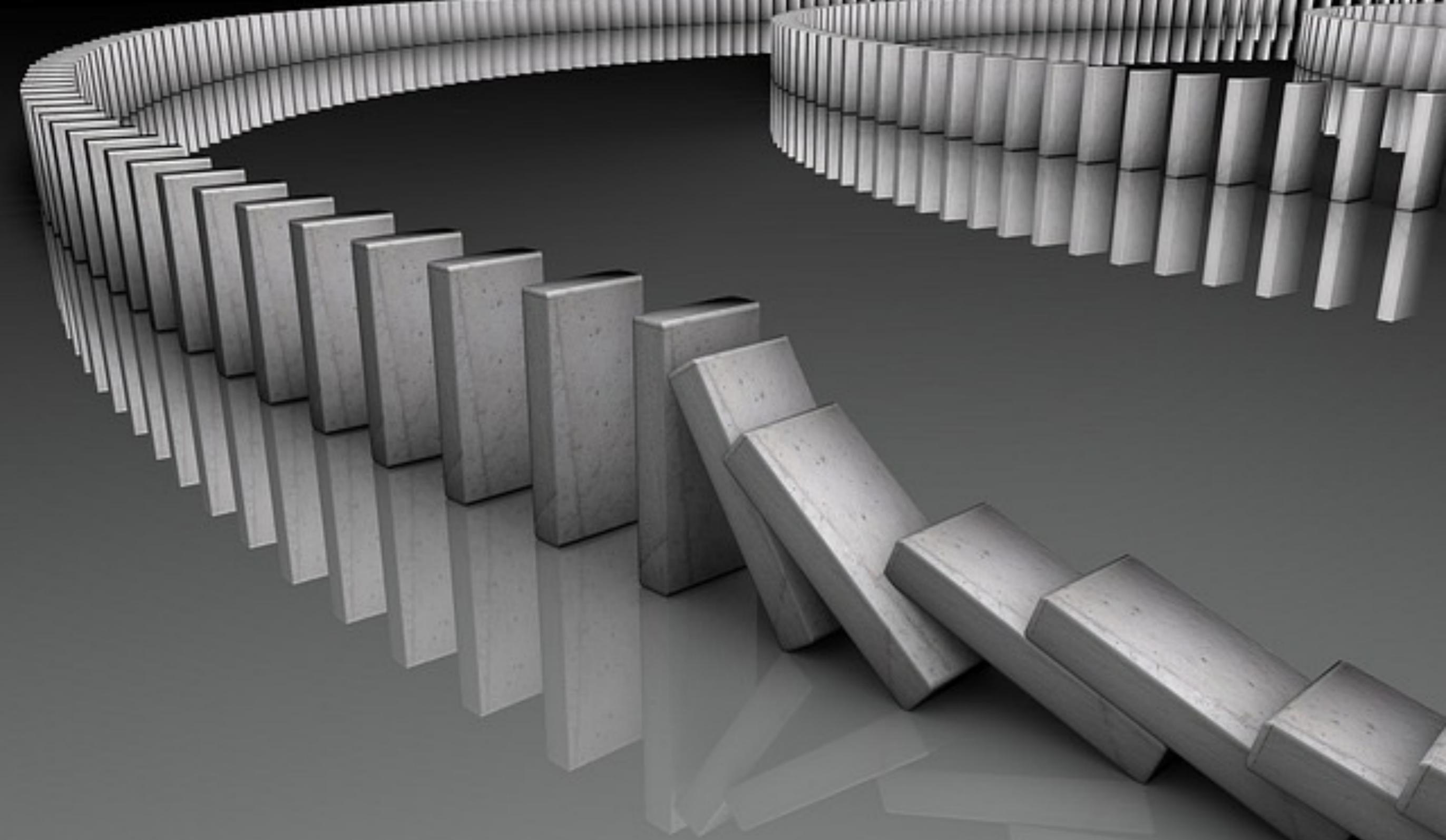
Chapter 3

The Causal Potency of Patterns

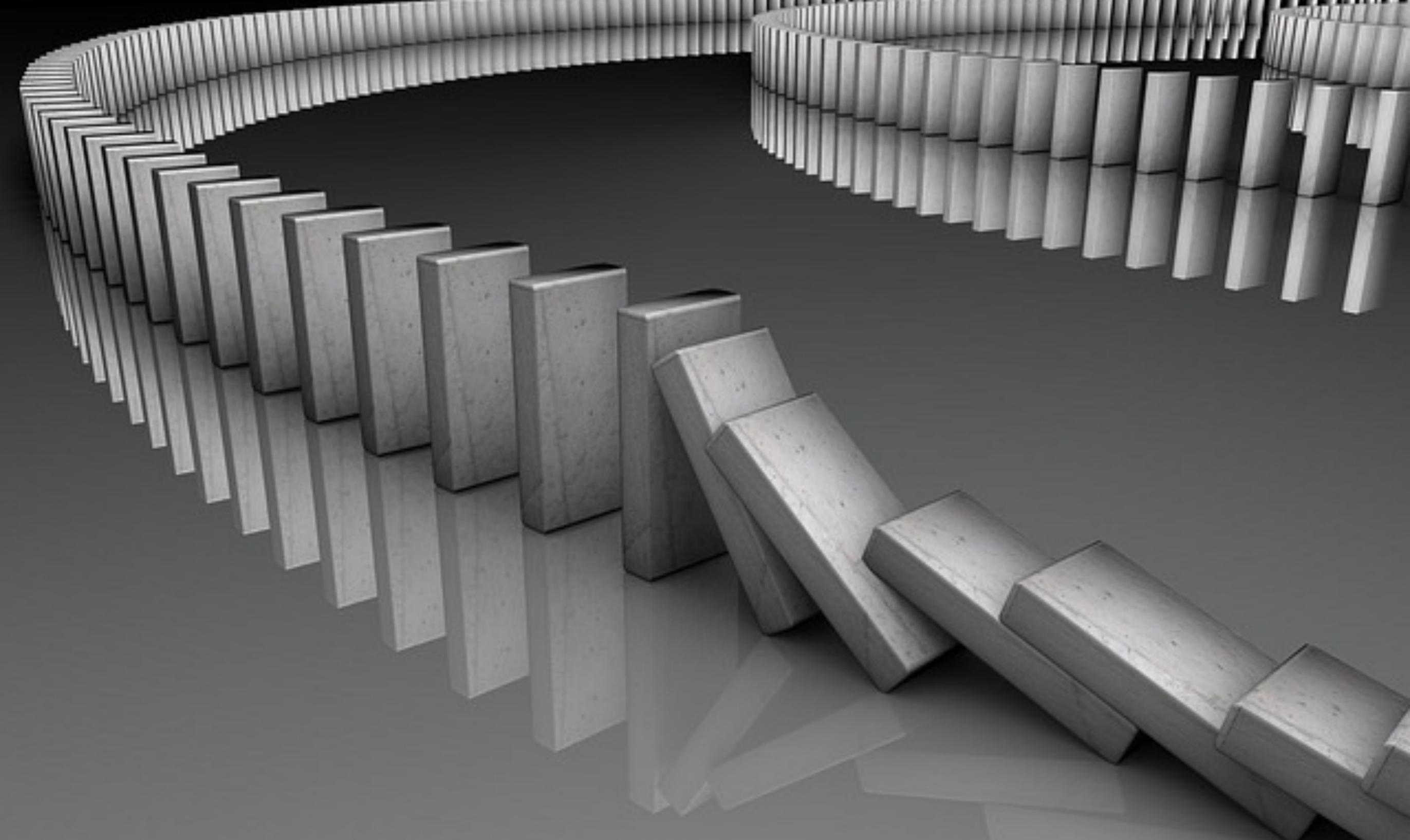
The Prime Mover 37



**a few concrete metaphors
that have helped me a
great deal in developing
my intuitions on this
elusive subject**



**The “domino chainium”
thought experiment!**



**“How come that domino there
is never falling?”**

Let me contrast two very different types of answer that someone might give.

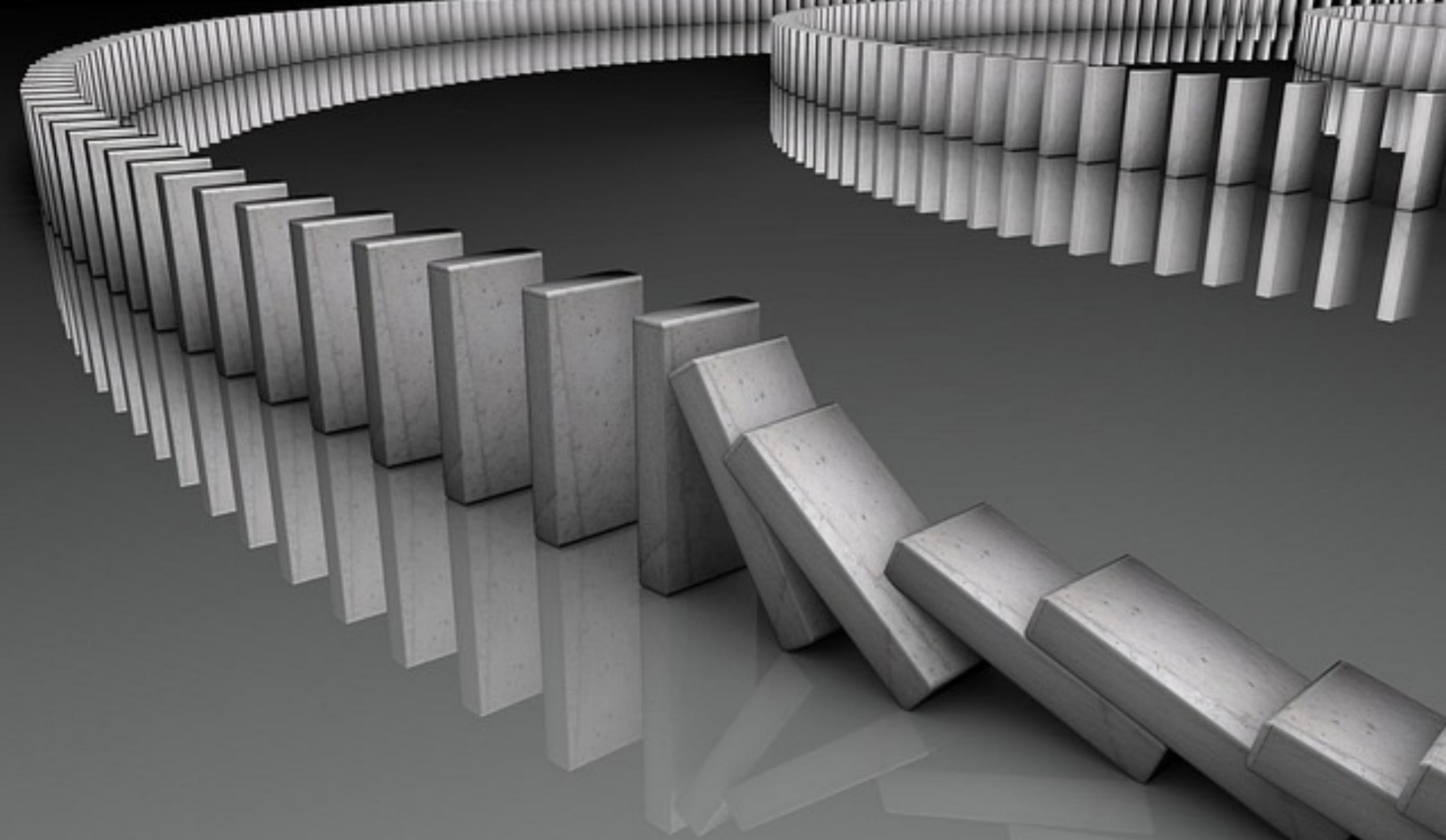
The first type of answer — myopic to the point of silliness — would be, “Because its predecessor never falls, you dummy!”

The second type of answer would be, "Because 641 is prime."

The second answer bypasses all the physics of gravity and domino chains and makes reference only to concepts that belong to a completely different domain of discourse.

The domain of prime numbers is as remote from the physics of toppling dominos as is the physics of quarks and gluons from the Cold War's "domino theory" of how communism would inevitably topple country after neighboring country in Southeast Asia.

In both cases, the two domains of discourse are many levels apart, and one is purely local and physical, while the other is global and organizational.



**So I ask: Who shoves whom
around inside the domino
chainium?**

Chapter 3

The Causal Potency of Patterns

The Causal Potency of Collective Phenomena

39



My next metaphor was dreamt up on an afternoon not long ago when I was caught in a horrendous traffic jam on some freeway out in the countryside, with several lanes of nearly touching cars all sitting stock still.



The root problem lies at some level of discourse other than that of cars. Though you may not know its nature, some higher-level, more abstract reason must lie behind this traffic jam.



No amount of expertise in car mechanics will help you to grasp the essence of such a situation; what is needed is knowledge of the abstract forces that can act on freeways and traffic. Cars are just pawns in the bigger game and, aside from the fact that they can't pass through each other and emerge intact post-crossing (as do ripples and other waves), their physical nature plays no significant role in traffic jams.



We are in a situation analogous to that in which the global, abstract, math-level answer “641 is prime” is far superior to a local, physical, domino-level answer.



Chapter 3

The Causal Potency of Patterns

Neurons and Dominos

40



As long as we avoid simplistic notions such as a privileged “grand-music neuron”, we can use the domino-chainium metaphor to think about brains, and especially to remind ourselves of how, for a given phenomenon in a brain, there can be vastly different explanations belonging to vastly different domains of discourse at vastly different levels of abstraction.

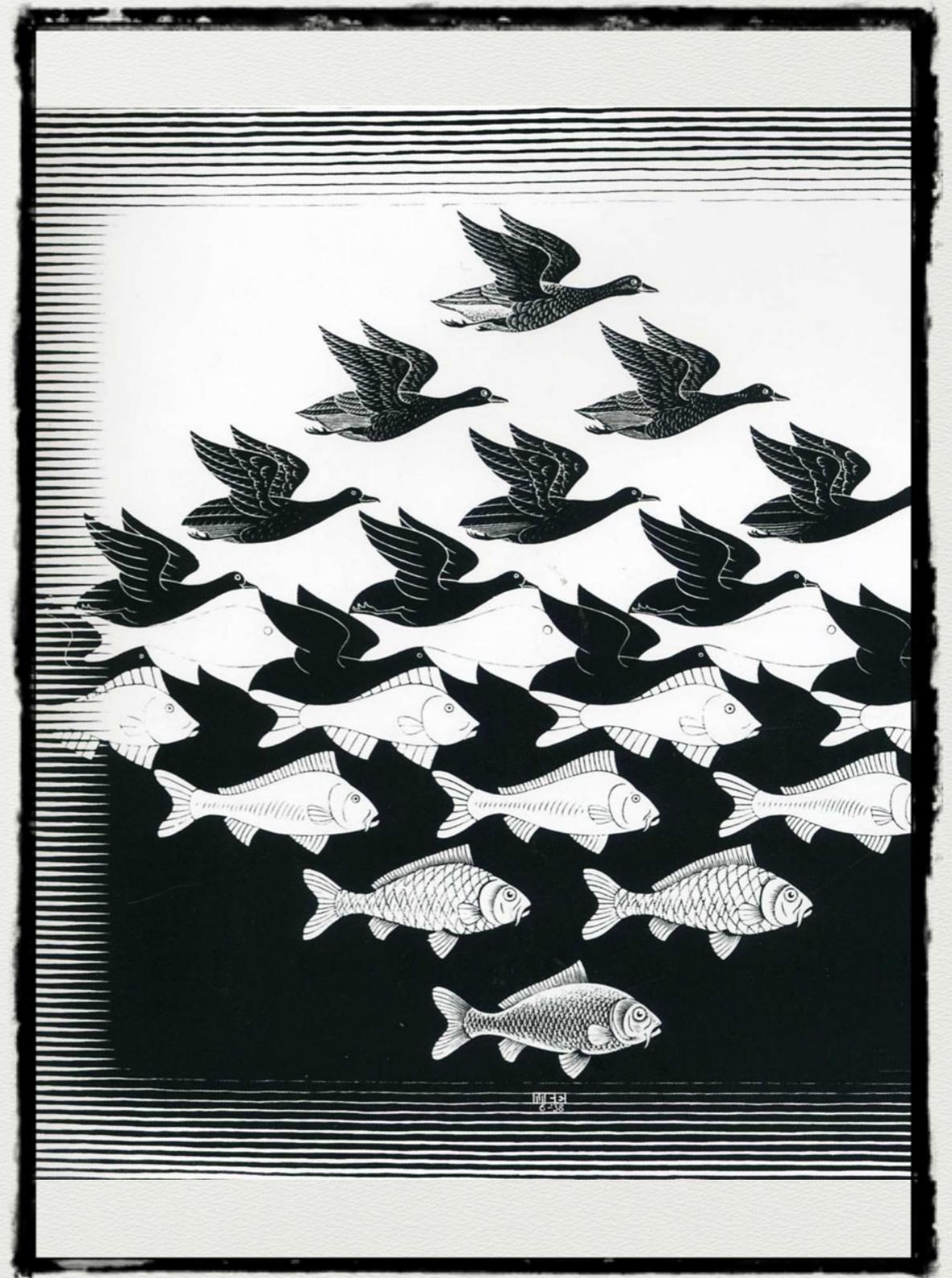


Chapter 3

The Causal Potency of Patterns

Patterns as Causes

40



I hope that in light of these images, Roger Sperry's comments about "the population of causal forces" and "overall organizational forces and dynamic properties" in a complex system like the brain or the chiasm have become clearer.

This high-level description of what happens is the *only* level of description that is relevant, because all the microdetails could be changed and exactly the same thing (at least from the human engineer's point of view) would still happen.

Chapter 3

The Causal Potency of Patterns

**The Strange Irrelevance
of Lower Levels**

42



This idea — that the bottom level, though 100 percent *responsible* for what is happening, is nonetheless *irrelevant* to what happens — sounds almost paradoxical, and yet it is an everyday truism.

As I put it in Chapter 2, “Our existence as animals whose perception is limited to the world of everyday macroscopic objects forces us, quite obviously, to function without any reference to entities and processes at microscopic levels. No one really knew the slightest thing about atoms until only about a hundred years ago, and yet people got along perfectly well.”

Chapter 3

The Causal Potency of Patterns

A Hat-tip to the
Spectrum of
Unpredictability

43



DH presents a range of examples of the predictable and the unpredictable.

The macroscopic world as experienced by humans is, in short, an intimate mixture ranging from the most predictable events all the way to wildly unpredictable ones. Our first few years of life familiarize us with this spectrum, and the degree of predictability of most types of actions that we undertake becomes second nature to us. By the time we emerge from childhood, we have acquired a reflex-level intuition for where most of our everyday world's loci of unpredictability lie, and the more unpredictable end of this spectrum simultaneously beckons to us and frightens us. We're pulled by but fearful of risk-taking. That is the nature of life.

Chapter 3

The Causal Potency of Patterns

The Careenium

45



I now move to a somewhat more complex metaphor for thinking about the multiple levels of causality in our brains and minds (and eventually, if you will indulge me in this terminology, in our souls).

DH sketches a pool table with constantly moving simms and symbols - THE CAREENIUM.

Chapter 3

The Causal Potency of Patterns

Simmballism

45



...the configurations of simmballs *reflect the history* of the impinging outer-world events. In short, for someone who looked at the simmballs and knew how to read their configuration, the simmballs would be *symbolic*, in the sense of *encoding events*. That's why the corny pun.

**The key idea is that
whereas no simm on its
own encodes anything
or plays a symbolic role,
the simmballs, on their
far more macroscopic
level, *do* encode and *are*
symbolic.**

Chapter 3

The Causal Potency of Patterns

**Taking the
Reductionistic View of
the Careenium**

46



...particles won't respect any such macroscopic line — no more than ants respect the property lines carefully surveyed and precisely drawn by human beings. No fixed portion of the universe can be tightly fenced off from interacting with the rest — not even approximately. To a reductionist, the idea of carving the universe up into zones with inviolable macroscopic spatiotemporal boundary lines makes no sense.

The point is that one gets into very hot water if one goes the fully reductionistic route; not only do all the objects in “the system” become microscopic and uncountably numerous, but also the system itself grows beyond bounds in space and time and becomes, in the end, the entire universe taken over all of time. There is no comprehensibility left, since everything is shattered into a trillion trillion trillion invisible pieces that are scattered hither and yon. Reductionism is merciless.

Chapter 3

The Causal Potency of Patterns

**Taking a Higher-level
View of the Careenium
48**



If, on the other hand, there is a perceptible and comprehensible “logic” to events at the level of epiphenomena, then we humans are eager to jump to that level. In fact, we have no choice.

DH then sketches this higher view where only 'simmballs' show (simms receding into a gray background).

Chapter 3

The Causal Potency of Patterns

**Who Shoves Whom
Around inside the
Careenium?**

49



And so we finally have come to the crux of the matter:
Which of these two views of the careenium is the truth?
Or, to echo the key question posed by Roger Sperry, *Who shoves whom around in the population of causal forces that occupy the careenium?*

**Indeed, the
simmballs' logic,
not surprisingly,
has to do with the
concepts that the
simmballs
symbolize.**

Chapter 3

The Causal Potency of Patterns

**The Dance of the
Simmballs**

50



From our higher-level macroscopic vantage point as we hover above the table, we can see *ideas* giving rise to other *ideas*, we can see one symbolic event *reminding* the system of another symbolic event, we can see elaborate patterns of simmballs coming together and forming even larger patterns that constitute *analogies* – in short, we can visually eavesdrop on the logic of a thinking mind taking place in the patterned dance of the simmballs. And in this latter view, *it is the simmballs that shove each other about, at their own isolated symbolic level.*

If this all seems topsy-turvy, it certainly is – but it is nonetheless completely consistent with the fundamental causality of the laws of physics.

A black and white photograph of a round plate with a decorative floral border. The plate is filled with several dumplings, some of which are cut in half to reveal their filling. The text "To Be Continued" is overlaid in the center of the image in a white, serif font.

To Be Continued