

## The Paradigm Discourses

### “Paired Correlations”

*Science is the belief in the ignorance of experts.*

– Feynman

Paradigm was sitting on the windowsill, enjoying the view of the valley below. No sunset today, the cloud cover was too thick, but the dark clouds colored the nestled townscape in interesting bands. The rest of the team had paired up and were playing quantum tic-tac-toe on large poster boards spread around Understanding’s living room. Even Understanding was participating.

That got Paradigm’s attention: 10 members, paired up except for himself, that left a remainder of 1. Who wasn’t playing? He immediately guessed Dogma, but he was playing against Curiosity. Theory and Experiment had vied off across each other, natch, Logic against Proof, and Mathematics was opposite Understanding, one pair on every wall. That left Reason...Paradigm eventually spied him sitting cross legged in the middle of the living room apparently trying to observe all four games at once. He looked focused.

Paradigm almost got up to see what he was up to, but then thought better of it. He returned to his own reverie, it might be interesting to see, later, what Reason came up with.

Reason was in the zone. Last week’s revelation, that X had a winning strategy in quantum tic-tac-toe when there wasn’t one in classical tic-tac-toe, still struck him as revelatory. What else might this little game have up its sleeve? He noticed the flip chart in the corner, on its portable tripod, still showing the 9-Dot puzzle from a few months ago. He rose, went over, and stood in front of it. Flipping pages he found Curiosity’s lecture on quantum tic-tac-toe from last week, flipped farther to find her last page, the one with eight pairs of spooky marks, two spooky marks in every square except the center one. Very uniform he thought.

He scrutinized it, then looked at the four games in progress, widely spread around the room. *Hmmm...* Flipping to the next blank page, he reproduced her last example, but only up through move 6. Then rummaging through Understanding’s desk, he returned with a pair of scissors, an action that did not go unnoticed.

Reason carefully looked over the quantum board, then cut out five squares, the four side squares and the one center square, all in one piece: like a giant plus sign. He carried it over to the opposite corner and attached it to the message cork board. He double checked there was a healthy supply of stick pins beneath it, then returned to the tripod, now with just the four corner squares, each containing only one spooky mark.

Catching Paradigm’s eye, he motioned him to come over, which he did, surreptitiously, a move which nonetheless garnered the attention of Curiosity. Without a word, Reason indicated she should go over to the opposite corner of the room, where the center and four side squares, the ‘+’ sign, were hanging. Instinctively she dragged Dogma with her.

Mathematics had already halted his game with Understanding; something was a foot. Then Reason just waited.

Dogma whispered to Curiosity, “What’s going on?”

“I don’t know, but the anticipation is exciting.” she looked at him, “Don’t you think?”

Dogma didn’t know what to think but seeing Paradigm on the opposite side of the room seemed portentous, and that was never a good thing.

Almost in unison, the last four players also halted, took in the situation, then focused on Reason.

“Mathematics, would you be so kind as to join Dogma and Curiosity.” While he complied, Reason called out the next instructions, “Logic and Proof, I need you as runners, if you would please join us over here.”

Theory, with hands in the air, “Hey, what are we, chopped liver?” Experiment mimed his friend.

Reason, with quick wit, responded solemnly, “You two shall be our witnesses, of an experimental test of the theoretical principle that quantum systems permit phenomenon disallowed in classical systems.” That seemed to satisfy them, if not outright honor them.

Then to the whole room, “Paradigm and I will each make a move, moves 7 and 8 of this game, creating a cyclic entanglement of all eight moves. Understanding will then select a random collapse, deciding in which square move 8 becomes classical. Next, Logic and Proof will determine which side squares have X’s and which have O’s marking them with colored stick pins. They may have to traverse the room a couple of times to get that right. Gentlemen, choose your colors wisely, for Mathematics’ job will be to discern the patterns. Everyone clear on their roles?”

With nods all around, he turned to Paradigm.

“You will play X’s move 7, but I’m restricting you to either squares 1 & 7, or squares 1 & 9 – vertical or diagonal. I’ll then play O’s move 8, and make the comparable move, but in either squares 3 & 9, or squares 3 & 7 – likewise vertical or diagonal.” In a whisper, “Do you see what is coming?”

Paradigm slowly nodded, then grinned, then wagging his finger, “Double teaming Dogma, truly, we should be ashamed of ourselves. I’m in, I’m all in.”

Understanding played his role, flipping a mental coin after each pair of moves by Paradigm and Reason. He was pleased at the team’s tolerance for tedium, Proof and Logic running back and forth across the room tracing out the cyclic entanglement, placing colored stickpins in the side squares.

After about two dozen games Mathematics raised his hand.

Once he had everyone’s attention, “That should suffice, the patterns are clear. Paradigm and Reason conspired to make either of two pairs of moves, call them vertical and diagonal. They randomized their choices, and Understanding randomized their collapse. When they made vertical moves, Proof and Logic recorded X’s in red and O’s in blue, when they made diagonal moves,

they recorded X's in green and O's in yellow. Thus, we find that there are roughly equal numbers of all four colors in each of the four side squares, squares 2, 4, 6, and 8.

“This is an exact analog to the randomness we see in quantum systems.

“However,” he paused, “when they made *vertical* moves, the red pins would show up in squares 2 & 4, or in 6 & 8, while the blue pins would show up in squares 6 & 8, or 2 & 4. But” he paused again, swallowed, “when they made *diagonal* moves, the green pins would show up in squares 2 & 8, or in 4 & 6, while the yellow pins would show up in squares 4 & 6, or 2 & 8. These are not the same, this is a discernable pattern.” Dogma did a double take, he looked at the side squares, at the pins they contained – the patterns were exactly as claimed.

Mathematics paused, this time for dramatic effect, “While each individual square has random colors, the pairs do not, the randomness in this corner of the room has been coordinated, in one of two ways, by the choice made from the opposite corner of the room. That's a signal, a super signal.

“This shows that in principle, it is possible to overcome Dogma's 6th objection, that the randomness of quantum systems thwarts any attempt to supersede letter speed. Randomness *here*, can be correlated in selectable ways,” he pointed, “from way over *there*.”