



The Bayesian Conspiracy

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Initiation Ceremony

The torches that lit the narrow stairwell burned intensely and in the wrong color, flame like melting gold or shattered suns.

192... 193...

Brennan's sandals clicked softly on the stone steps, snicking in sequence, like dominos very slowly falling.

227... 228...

Half a circle ahead of him, a trailing fringe of dark cloth whispered down the stairs, the robed figure itself staying just out of sight.

239... 240...

Not much longer, Brennan predicted to himself, and his guess was accurate:

Sixteen times sixteen steps was the number, and they stood before the portal of glass.

The great curved gate had been wrought with cunning, humor, and close attention to indices of refraction: it warped light, bent it, folded it, and generally abused it, so that there were hints of what was on the other side (stronger light sources, dark walls) but no possible way of *seeing through*—unless, of course, you had the key: the counter-door, thick for thin and thin for thick, in which case the two would cancel out.

From the robed figure beside Brennan, two hands emerged, gloved in reflective cloth to conceal skin's color. Fingers like slim mirrors grasped the handles of the warped gate—handles that Brennan had not guessed; in all that distortion, shapes could only be anticipated, not seen.

"Do you want to know?" whispered the guide; a whisper nearly as loud as an ordinary voice, but not revealing the slightest hint of gender.

Brennan paused. The answer to the question seemed suspiciously, indeed extraordinarily obvious, even for ritual.

"Yes," Brennan said finally.

The guide only regarded him silently.

"Yes, I want to know," said Brennan.

"Know *what*, exactly?" whispered the figure.

Brennan's face scrunched up in concentration, trying to visualize the game to its end, and hoping he hadn't blown it already; until finally he fell back on the first and last resort, which is the truth:

"It doesn't matter," said Brennan, "the answer is still yes."

The glass gate parted down the middle, and slid, with only the tiniest scraping sound, into the surrounding stone.

The revealed room was lined, wall-to-wall, with figures robed and hooded in light-absorbing cloth. The straight walls were not themselves black stone, but mirrored, tiling a square grid of dark robes out to infinity in all directions; so that it seemed as if the people of some much vaster city, or perhaps the whole human kind, watched in assembly. There was a hint of moist warmth in the air of the room, the breath of the gathered: a scent of crowds.

Brennan's guide moved to the center of the square, where burned four torches of that relentless yellow flame. Brennan followed, and when he stopped, he realized with a slight shock that all the cowed hoods were now looking directly at him. Brennan had never before in his life been the focus of such absolute attention; it was frightening, but not entirely unpleasant.

"He is here," said the guide in that strange loud whisper.

The endless grid of robed figures replied in one voice: perfectly blended, exactly synchronized, so that not a single individual could be singled out from the rest, and betrayed:

"Who is absent?"

"Jakob Bernoulli," intoned the guide, and the walls replied:

"Is dead but not forgotten."

Abraham de Moivre,"

"Is dead but not forgotten."

"Pierre-Simon Laplace,"

"Is dead but not forgotten."

"Edwin Thompson Jaynes,"

"Is dead but not forgotten."

"They died," said the guide, "and they are lost to us; but we still have each other, and the project continues."

In the silence, the guide turned to Brennan, and stretched forth a hand, on which rested a small ring of nearly transparent material.

Brennan stepped forward to take the ring—

But the hand clenched tightly shut.

"If three-fourths of the humans in this room are women," said the guide, "and three-fourths of the women and half of the men belong to the Heresy of Virtue, and I am a Virtuist, what is the probability that I am a man?"

"Two-elevenths," Brennan said confidently.

There was a moment of absolute silence.

Then a titter of shocked laughter.

The guide's whisper came again, truly quiet this time, almost nonexistent: "It's one-sixth, actually."

Brennan's cheeks were flaming so hard that he thought his face might melt off. The instinct was very strong to run out of the room and up the stairs and flee the city and change his name and start his life over again and get it right this time.

"An honest mistake is at least honest," said the guide, louder now, "and we may know the honesty by its relinquishment. If I am a Virtuist, what is the probability that I am a man?"

"One—" Brennan started to say.

Then he stopped. Again, the horrible silence.

"Just say 'one-sixth' already," stage-whispered the figure, this time loud enough for the walls to hear; then there was more laughter, not all of it kind.

Brennan was breathing rapidly and there was sweat on his forehead. If he was wrong about this, he really was going to flee the city. "Three fourths women times three fourths Virtuists is nine sixteenths female Virtuists in this room. One fourth men times one half Virtuists is two sixteenths male Virtuists. If I have only that information and the fact that you are a Virtuist, I would then estimate odds of two to nine, or a probability of two-elevenths, that you are male. Though I do not, in fact, believe the information given is correct. For one thing, it seems too neat. For another, there are an odd number of people in this room."

The hand stretched out again, and opened.

Brennan took the ring. It looked almost invisible, in the torchlight; not glass, but some material with a refractive index very close to air. The ring was warm from the guide's hand, and felt like a tiny living thing as it embraced his finger.

The relief was so great that he nearly didn't hear the cowled figures applauding.

From the robed guide came one last whisper:

"You are now a novice of the Bayesian Conspiracy."



Image: *The Bayesian Master*, by Erin Devereux

The Failures of Eld Science

This time there were no robes, no hoods, no masks. Students were expected to become friends, and allies. And everyone knew why you were in the classroom. It would have been pointless to pretend you weren't in the Conspiracy.

Their *sensei* was Jeffreyssai, who might have been the best of his era, in his era. His students were either the most promising learners, or those whom the *beisutsukai* saw political advantage in molding.

Brennan fell into the latter category, and knew it. Nor had he hesitated to use his Mistress's name to open doors. You used every avenue available to you, in seeking knowledge; that was respected here.

"—for over thirty years," Jeffreyssai said. "Not one of them saw it; not Einstein, not Schrödinger, not even von Neumann." He turned away from his sketcher, and toward the classroom. "I pose to you to the question: How did they fail?"

The students exchanged quick glances, a calculus of mutual risk between the wary and the merely baffled. Jeffreyssai was known to play games.

Finally Hiriwa-called-the-Black leaned forward, jangling slightly as her equation-carved bracelets shifted on her ankles. "By your years given, *sensei*, this was two hundred and fifty years after Newton. Surely, the scientists of that era must have grokked the concept of a universal law."

"Knowing the universal law of gravity," said the student Taji, from a nearby seat, "is not the same as understanding the concept of a universal law." He was one of the promising ones, as was Hiriwa.

Hiriwa frowned. "No... it was said that Newton had been praised *for* discovering the first universal. Even in his own era. So it was known." Hiriwa paused. "But Newton himself would have been gone. Was there a *religious* injunction against proposing further universals? Did they refrain out of respect for Newton, or were they waiting for his *ghost* to speak? I am not clear on how Eld science was motivated—"

"No," murmured Taji, a laugh in his voice, "you really, *really* aren't."

Jeffreyssai's expression was kindly. "Hiriwa, it wasn't religion, and it wasn't lead in the drinking water, and they didn't all have Alzheimers, and they weren't sitting around all day reading webcomics. Forget the catalogue of horrors out of ancient times. Just think in terms of cognitive errors. What could Eld science have been *thinking* wrong?"

Hiriwa sat back with a sigh. "*Sensei*, I truly cannot imagine a snafu that would do *that*."

"It wouldn't be just *one* mistake," Taji corrected her. "As the saying goes: Mistakes don't travel alone; they hunt in packs."

"But the *entire* human species?" said Hiriwa. "Thirty years?"

"It wasn't the entire human species, Hiriwa," said Styrllyn. He was one of the older-looking students, wearing a short beard speckled in grey. "Maybe one in a hundred

thousand could have written out Schrödinger's Equation from memory. So that would have been their first and primary error—failure to concentrate their forces."

"*Spare us the propaganda!*" Jeffreyssai's gaze was suddenly fierce. "You are not here to proselytize for the Cooperative Conspiracy, my lord politician! Bend not the truth to make your points! I believe your Conspiracy has a phrase: 'Comparative advantage.' Do you *really* think that it would have helped to call in the whole human species, as it existed at that time, to debate quantum physics?"

Styrllyn didn't flinch. "Perhaps not, *sensei*," he said. "But if you are to compare that era to this one, it is a consideration."

Jeffreyssai moved his hand flatly through the air; the maybe-gesture he used to dismiss an argument that was true but not relevant. "It is not what I would call a *primary* mistake. The puzzle should not have required a billion physicists to solve."

"I can think of more *specific* ancient horrors," said Taji. "Spending all day writing grant proposals. Teaching undergraduates who would rather be somewhere else. Needing to publish thirty papers a year to get tenure..."

"But we are not speaking of only the lower-status scientists," said Yin; she wore a slightly teasing grin. "It was said of Schrödinger that he retired to a villa for a month, with his mistress to provide inspiration, and emerged with his eponymous equation. We consider it a famous historical success of our methodology. Some Eld physicists *did* understand how to focus their mental energies; and would have been senior enough to do so, had they chose."

"True," Taji said. "In the end, administrative burdens are only a generic obstacle. Likewise such answers as, 'They were not trained in probability theory, and did not know of cognitive biases.' Our sensei seems to desire some more specific reply."

Jeffreyssai lifted an eyebrow encouragingly. "Don't dismiss your line of thought so quickly, Taji; it begins to be relevant. What kind of system would create administrative burdens on its own people?"

"A system that failed to support its people adequately," said Styrllyn. "One that failed to value their work."

"Ah," said Jeffreyssai. "But there is a student who has not yet spoken. *Brennan?*"

Brennan didn't jump. He deliberately waited just long enough to show he wasn't scared, and then said, "Lack of pragmatic motivation, sensei."

Jeffreyssai smiled slightly. "Expand."

What kind of system would create administrative burdens on its own people?, their sensei had asked them. The other students were pursuing their own lines of thought. Brennan, hanging back, had more attention to spare for his teacher's few hints. Being the beginner wasn't *always* a disadvantage—and he had been taught, long before the Bayesians took him in, to take every available advantage.

"The Manhattan Project," Brennan said, "was launched with a specific *technological* end in sight: a weapon of great power, in time of war. But the error that Eld Science committed with respect to quantum physics had no immediate consequences for their technology. They were confused, but they had no desperate *need* for an answer."

Otherwise the surrounding system would have removed all burdens from their effort to solve it. Surely the Manhattan Project must have done so—Taji? Do you know?"

Taji looked thoughtful. "Not *all* burdens—but I'm pretty sure they weren't writing grant proposals in the middle of their work."

"So," Jeffreyssai said. He advanced a few steps, stood directly in front of Brennan's desk. "You think Eld scientists simply weren't trying hard enough. Because their art had no military applications? A rather *competitive* point of view, I should think."

"Not necessarily," Brennan said calmly. "Pragmatism is a virtue of rationality also. A desired *use* for a better quantum theory, would have helped the Eld scientists in many ways beyond just motivating them. It would have given shape to their curiosity, and told them what constituted success or failure."

Jeffreyssai chuckled slightly. "Don't guess so hard what I might prefer to hear, Competitor. Your first statement came closer to my hidden mark; your oh-so-Bayesian disclaimer fell wide... The factor I had in mind, Brennan, was that Eld scientists thought it was *acceptable* to take thirty years to solve a problem. Their entire social process of science was based on getting to the truth *eventually*. A wrong theory got discarded *eventually*—once the next generation of students grew up familiar with the replacement. Work expands to fill the time allotted, as the saying goes. But people can think important thoughts in far less than thirty years, if they *expect* speed of themselves." Jeffreyssai suddenly slammed down a hand on the arm of Brennan's chair. "*How long do you have to dodge a thrown knife?*"

"Very little time, sensei!"

"*Less than a second! Two opponents are attacking you! How long do you have to guess who's more dangerous?*"

"Less than a second, sensei!"

"*The two opponents have split up and are attacking two of your girlfriends! How long do you have to decide which one you truly love?*"

"Less than a second, sensei!"

"*A new argument shows your precious theory is flawed! How long does it take you to change your mind?*"

"Less than a second, sensei!"

"**WRONG! DON'T GIVE ME THE WRONG ANSWER JUST BECAUSE IT FITS A CONVENIENT PATTERN AND I SEEM TO EXPECT IT OF YOU!** How long does it really take, Brennan?"

Sweat was forming on Brennan's back, but he stopped and actually thought about it—

"**ANSWER, BRENNAN!**"

"*No sensei! I'm not finished thinking sensei! An answer would be premature! Sensei!*"

"*Very good! Continue! But don't take thirty years!*"

Brennan breathed deeply, reforming his thoughts. He finally said, "Realistically, sensei, the best-case scenario is that I would see the problem immediately; use the discipline of suspending judgment; try to re-accumulate all the evidence before continuing; and depending on how emotionally attached I had been to the theory, use the crisis-of-belief technique to ensure I could genuinely go either way. So at least five minutes and perhaps up to an hour."

"*Good! You actually thought about it that time! Think about it every time! Break patterns!* In the days of Eld Science, Brennan, it was not uncommon for a grant agency to spend six months reviewing a proposal. *They permitted themselves the time!* You are being graded on your *speed*, Brennan! The question is not whether you get there eventually! Anyone can find the truth in five thousand years! You need to *move faster!*"

"Yes, sensei!"

"Now, Brennan, have you just learned something new?"

"Yes, sensei!"

"How long did it take you to learn this new thing?"

An arbitrary choice there... "Less than a minute, sensei, from the boundary that seems most obvious."

"Less than a minute," Jeffreyssai repeated. "So, Brennan, how long do you think it should take to solve a major scientific problem, if you are not wasting any time?"

Now there was a trapped question if Brennan had ever heard one. There was no way to guess what time period Jeffreyssai had in mind—what the *sensei* would consider too long, or too short. Which meant that the only way out was to just try for the genuine truth; this would offer him the defense of honesty, little defense though it was. "One year, sensei?"

"Do you think it could be done in one month, Brennan? In a case, let us stipulate, where in principle you already have enough experimental evidence to determine an answer, but not so much experimental evidence that you can afford to make errors in interpreting it."

Again, no way to guess which answer Jeffreyssai might *want*... "One month seems like an unrealistically short time to me, sensei."

"A *short time*?" Jeffreyssai said incredulously. "How many minutes in thirty days? Hiriwa?"

"43200, sensei," she answered. "If you assume sixteen-hour waking periods and daily sleep, then 28800 minutes."

"Assume, Brennan, that it takes five whole minutes to think an *original* thought, rather than learning it from someone else. Does even a major scientific problem require 5760 distinct insights?"

"I confess, sensei," Brennan said slowly, "that I have never thought of it that way before... but do you tell me that is *truly* a realistic level of productivity?"

"No," said Jeffreyssai, "but neither is it realistic to think that a single problem requires 5760 insights. And yes, it has been done."

Jeffreyssai stepped back, and smiled benevolently. Every student in the room stiffened; they knew that smile. "Though none of you hit the particular answer that I had in mind, nonetheless your answers were as reasonable as mine. Except Styrlin's, I'm afraid. Even Hiriwa's answer was not entirely wrong: the task of proposing new theories was once considered a sacred duty reserved for those of high status, there being a limited supply of problems in circulation, at that time. But *Brennan's* answer is *particularly* interesting, and I am minded to test his theory of motivation."

Oh, hell, Brennan said silently to himself. Jeffreyssai was gesturing for Brennan to stand up before the class.

When Brennan had risen, Jeffreyssai neatly seated himself in Brennan's chair.

"Brennan-sensei," Jeffreyssai said, "you have five minutes to think of something stunningly brilliant to say about the failure of Eld science on quantum physics. As for the rest of us, our job will be to gaze at you expectantly. I can only imagine how embarrassing it will be, should you fail to think of anything good."

Bastard. Brennan didn't say it aloud. Taji's face showed a certain amount of sympathy; Styrlin held himself aloof from the game; but Yin was looking at him with sardonic interest. Worse, Hiriwa was gazing at him expectantly, assuming that he would rise to the challenge. And Jeffreyssai was gawking wide-eyed, waiting for the guru's words of wisdom. *Screw you, sensei*.

Brennan didn't panic. It was very, very, very far from being the scariest situation he'd ever faced. He took a moment to decide how to think; then thought.

At four minutes and thirty seconds, Brennan spoke. (There was an art to such things; as long as you were doing it anyway, you might as well make it look easy.)

"A woman of wisdom," Brennan said, "once told me that it is wisest to regard our past selves as fools beyond redemption—to see the people we once were as idiots entire. I do not necessarily say this myself; but it is what she said to me, and there is more than a grain of truth in it. As long as we are making excuses for the past, trying to make it look better, *respecting* it, we cannot make a clean break. It occurs to me that the rule may be no different for human *civilizations*. So I tried looking back and considering the Eld scientists as simple fools."

"Which they were not," Jeffreyssai said.

"Which they were not," Brennan continued. "In terms of raw intelligence, they undoubtedly exceeded me. But it occurred to me that a difficulty in seeing what Eld scientists did wrong, might have been in respecting the ancient and legendary names too highly. And that did indeed produce an insight."

"Enough introduction, Brennan," said Jeffreyssai. "If you found an insight, state it."

"Eld scientists were not trained..." Brennan paused. "No, *untrained* is not the concept. They were trained for the *wrong task*. At that time, there were no Conspiracies, no secret truths; as soon as Eld scientists solved a major problem, they published the solution to the world and each other. Truly scary and confusing *open problems* would have been in extremely rare supply, and used up the moment they

were solved. So it would not have been possible to train Eld researchers *to bring order out of scientific chaos*. They would have been trained for something else—I'm not sure what—"

"Trained to manipulate whatever science had *already* been discovered," said Taji. "It was a difficult enough task for Eld teachers to train their students to *use existing knowledge*, or follow already-known methodologies; that was all Eld science teachers aspired to impart."

Brennan nodded. "Which is a *very* different matter from creating new science of their own. The Eld scientists faced with problems of quantum theory, might never have faced that kind of *fear* before—the dismay of not knowing. The Eld scientists might have seized on unsatisfactory answers prematurely, because they were accustomed to working with a neat, agreed-upon body of knowledge."

"Good, Brennan," murmured Jeffreyssai.

"But above all," Brennan continued, "an Eld scientist couldn't have *practiced* the actual problem the quantum scientists faced—that of resolving a major confusion. It was something you did once per lifetime if you were lucky, and as Hiriwa observed, Newton would no longer have been around. So while the Eld physicists who messed up quantum theory were not unintelligent, they were, in a strong sense, *amateurs*—ad-libbing the whole process of paradigm shift."

"And no probability theory," Hiriwa noted. "So anyone who *did* succeed at the problem would have no idea what they'd just done. They wouldn't be able to communicate it to anyone else, except vaguely."

"Yes," Styrllyn said. "And it was only a handful of people who could tackle the problem at all, with no training in doing so; those are the physicists whose names have passed down to us. A handful of people, making a handful of discoveries each. It would not have been enough to sustain a community. Each Eld scientist tackling a new paradigm shift would have needed to rediscover the rules from scratch."

Jeffreyssai rose from Brennan's desk. "Acceptable, Brennan; you surprise me, in fact. I shall have to give further thought to this method of yours." Jeffreyssai went to the classroom door, then looked back. "However, I did have in mind at least one *other* major flaw of Eld science, which none of you suggested. I expect to receive a list of possible flaws tomorrow. I expect the flaw I have in mind to be on the list. You have 480 minutes, excluding sleep time. I see five of you here. The challenge does not require more than 480 insights to solve, nor more than 96 insights in series."

And Jeffreyssai left the room.

Class Project

"Do as well as Einstein?" Jeffreyssai said, incredulously. "*Just* as well as Einstein? Albert Einstein was a great scientist of his era, but that was his era, not this one! Einstein did not comprehend the Bayesian methods; he lived before the cognitive biases were discovered; he had no scientific grasp of his own thought processes. Einstein spoke nonsense of an impersonal God—which tells you how well he understood the rhythm of reason, to discard it outside his own field! He was too caught up in the drama of rejecting his era's quantum mechanics to actually *fix* it. And while I grant that Einstein reasoned cleanly in the matter of General Relativity—barring that matter of the cosmological constant—he took ten years to do it. Too slow!"

"*Too slow?*" repeated Taji incredulously.

"Too slow! If Einstein were in this classroom now, rather than Earth of the negative first century, I would rap his knuckles! *You will not try to do as well as Einstein! You will aspire to do BETTER than Einstein or you may as well not bother!*"

Jeffreyssai shook his head. "Well, I've given you enough hints. It is time to test your skills. Now, I know that the other *beisutsukai* don't think much of my class projects..." Jeffreyssai paused significantly.

Brennan inwardly sighed. He'd heard this line many times before, in the Bardic Conspiracy, the Competitive Conspiracy: *The other teachers think my assignments are too easy, you should be grateful*, followed by some ridiculously difficult task—

"They say," Jeffreyssai said, "that my projects are too hard; insanely hard; that they pass from the realm of madness into the realm of Sparta; that Laplace himself would catch on fire; they accuse me of trying to tear apart my students' souls—"

Oh, crap.

"But there is a reason," Jeffreyssai said, "why many of my students have achieved great things; and by that I do not mean high rank in the Bayesian Conspiracy. I expected much of them, and they came to expect much of themselves. So..."

Jeffreyssai took a moment to look over his increasingly disturbed students, "Here is your assignment. Of quantum mechanics, and General Relativity, you have been told. This is the limit of Eld science, and hence, the limit of public knowledge. The five of you, working on your own, are to produce the correct theory of quantum gravity. Your time limit is one month."

"*What?*" said Brennan, Taji, Styrlын, and Yin. Hiriwa gave them a puzzled look.

"Should you succeed," Jeffreyssai continued, "you will be promoted to *beisutsukai* of the second *dan* and sixth level. We will see if you have learned speed. Your clock starts—*now*."

And Jeffreyssai strode out of the room, slamming the door behind him.

"This is crazy!" Taji cried.

Hiriwa looked at Taji, bemused. "The solution is not known to us. How can you know it is so difficult?"

"Because we *knew* about this problem back in the Eld days! Eld scientists worked on this problem for a lot longer than one month."

Hiriwa shrugged. "They were still arguing about many-worlds too, weren't they?"

"*Enough! There's no time!*"

The other four students looked to Styrllyn, remembering that he was said to rank high in the Cooperative Conspiracy. There was a brief moment of weighing, of assessing, and then Styrllyn was their leader.

Styrllyn took a great breath. "We need a list of approaches. Write down all the angles you can think of. Independently—we need your individual components before we start combining. In five minutes, I'll ask each of you for your best idea first. *No wasted thoughts! Go!*"

Brennan grabbed a sheet and his tracer, set the tip to the surface, and then paused. He couldn't think of anything clever to say about unifying general relativity and quantum mechanics...

The other students were already writing.

Brennan tapped the tip, once, twice, thrice. General relativity and quantum mechanics...

Taji put his first sheet aside, grabbed another.

Finally, Brennan, for lack of anything clever to say, wrote down the obvious.

Minutes later, when Styrllyn called time, it was still all he had written.

"All right," Styrllyn said, "your best idea. Or the idea you most want the rest of us to take into account in our second components. Taji, go!"

Taji looked over his sheets. "Okay, I think we've got to assume that every avenue that Eld science was trying is a blind alley, or they would have found it. And if this is possible to do in one month, the answer must be, in some sense, elegant. So no multiple dimensions. If we start doing anything that looks like we should call it 'string theory', we'd better stop. Maybe begin by considering how failure to understand decoherence could have led Eld science astray in quantizing gravity."

"The opposite of folly is folly," Hiriwa said. "Let us pretend that Eld science never existed."

"No criticisms yet!" said Styrllyn. "Hiriwa, your suggestion?"

"Get rid of the infinities," said Hiriwa, "extirpate [that which permits them](#). It should not be a matter of cleverness with integrals. A *representation* that allows infinity must be false-to-fact."

"Yin."

"We know from common sense," Yin said, "that if we stepped outside the universe, we would see time laid out all at once, reality like a crystal. But I once encountered a hint that physics is timeless in a deeper sense than that." Yin's eyes were distant, remembering. "Years ago, I found an abandoned city; it had been uninhabited for eras, I think. And behind a door whose locks were broken, carved into one wall: quote *.ua sai .ei mi vimcu ty bu le mekso* unquote."

Brennan translated: *Eureka! Eliminate t from the equations.* And written in Lojban, the sacred language of science, which meant the unknown writer had thought it to be true.

"The '[timeless physics](#)' of which we've all heard rumors," Yin said, "may be timeless in a very literal sense."

"My own contribution," Styrlын said. "The quantum physics we've learned is over joint positional configurations. It seems like we should be able to take that apart into a [spatially local representation](#), in terms of invariant distant entanglements. Finding that representation might help us integrate with general relativity, whose curvature is local."

"A strangely *individualist* perspective," Taji murmured, "for one of the Cooperative Conspiracy."

Styrlын shook his head. "You misunderstand us, then. The first lesson we learn is that groups are made of people... no, there is no time for politics. Brennan!"

Brennan shrugged. "Not much, I'm afraid, only the obvious. Inertial mass-energy was always observed to equal gravitational mass-energy, and Einstein showed that they were necessarily the same. So why is the 'energy' that is an eigenvalue of the quantum Hamiltonian, *necessarily* the same as the 'energy' quantity that appears in the equations of General Relativity? Why should spacetime curve at the same rate that the little arrows rotate?"

There was a brief pause.

Yin frowned. "That seems *too* obvious. Wouldn't Eld science have figured it out already?"

"Forget Eld science existed," Hiriwa said. "The question stands: we need the answer, whether it was known in ancient times or not. It cannot possibly be *coincidence*."

Taji's eyes were abstracted. "Perhaps it would be possible to show that an exception to the equality would violate some conservation law..."

"That is not where Brennan pointed," Hiriwa interrupted. "He did not ask for a proof that they must be set equal, given some appealing principle; he asked for a view in which the two are one and cannot be divided even conceptually, as was accomplished for inertial mass-energy and gravitational mass-energy. For we must assume that the beauty of the whole arises from the fundamental laws, and not the other way around. Fair-rephrasing?"

"Fair-rephrasing," Brennan replied.

Silence reigned for thirty-seven seconds, as the five pondered the five suggestions.

"I have an idea..."

The Ritual

The room in which Jeffreyssai received his non-*beisutsukai* visitors was quietly formal, impeccably appointed in only the most conservative tastes. Sunlight and outside air streamed through a grillwork of polished silver, a few sharp edges making it clear that this wall was not to be opened. The floor and walls were glass, thick enough to distort, to a depth sufficient that it didn't matter what might be underneath. Upon the surfaces of the glass were subtly scratched patterns of no particular meaning, scribed as if by the hand of an artistically inclined child (and this was in fact the case).

Elsewhere in Jeffreyssai's home there were rooms of other style; but this, he had found, was what most outsiders expected of a Bayesian Master, and he chose not to enlighten them otherwise. That quiet amusement was one of life's little joys, after all.

The guest sat across from him, knees on the pillow and heels behind. She was here solely upon the business of her Conspiracy, and her attire showed it: a form-fitting jumpsuit of pink leather with even her hands gloved—all the way to the hood covering her head and hair, though her face lay plain and unconcealed beneath.

And so Jeffreyssai had chosen to receive her in this room.

Jeffreyssai let out a long breath, exhaling. "Are you *sure*?"

"Oh," she said, "and do I have to be *absolutely certain* before my advice can shift your opinions? Does it not suffice that I am a domain expert, and you are not?"

Jeffreyssai's mouth twisted up at the corner in a half-smile. "How do *you* know so much about the rules, anyway? You've never had so much as a Planck length of formal training."

"Do you even need to ask?" she said dryly. "If there's one thing that you *beisutsukai* do love to go on about, it's the reasons why you do things."

Jeffreyssai inwardly winced at the thought of trying to pick up rationality by watching other people talk about it—

"And don't inwardly wince at me like that," she said. "I'm not trying to be a rationalist myself, just trying to win an argument with a rationalist. There's a difference, as I'm sure you tell your students."

Can she really read me that well? Jeffreyssai looked out through the silver grillwork, at the sunlight reflected from the faceted mountainside. Always, always the golden sunlight fell each day, in this place far above the clouds. An unchanging thing, that light. The distant Sun, which that light represented, was in five billion years burned out; but now, in *this* moment, the Sun still shone. And that could never alter. Why wish for things to stay the same way forever, when that wish was already granted as absolutely as any wish could be? The paradox of permanence and impermanence: only in the latter perspective was there any such thing as progress, or loss.

"You have always given me good counsel," Jeffreyssai said. "Unchanging, that has been. Through all the time we've known each other."

She inclined her head, acknowledging. This was true, and there was no need to spell out the implications.

“So,” Jeffreyssai said. “Not for the sake of arguing. Only because I want to know the answer. *Are you sure?*” He didn’t even see how she could *guess*.

“Pretty sure,” she said, “we’ve been collecting statistics for a long time, and in nine hundred and eighty-five out of a thousand cases like yours—”

Then she laughed at the look on his face. “No, I’m joking. Of course I’m not sure. This thing only you can decide. But I *am* sure that you should go off and do whatever it is you people do—I’m quite sure you have a ritual for it, even if you won’t discuss it with outsiders—when you *very seriously consider* abandoning a long-held premise of your existence.”

It was hard to argue with that, Jeffreyssai reflected, the more so when a domain expert had told you that you were, in fact, probably wrong.

“I concede,” Jeffreyssai said. Coming from his lips, the phrase was spoken with a commanding finality. *There is no need to argue with me any further: you have won.*

“Oh, stop it,” she said. She rose from her pillow in a single fluid shift without the slightest wasted motion. She didn’t flaunt her age, but she didn’t conceal it either. She took his outstretched hand, and raised it to her lips for a formal kiss. “Farewell, sensei.”

“Farewell?” repeated Jeffreyssai. That signified a higher order of departure than *goodbye*. “I do intend to visit you again, milady; and you are always welcome here.”

She walked toward the door without answering. At the doorway she paused, without turning around. “It won’t be the same,” she said. And then, without the movements seeming the least rushed, she walked away so swiftly it was almost like vanishing.

Jeffreyssai sighed. But at least, from here until the challenge proper, all his actions were prescribed, known quantities.

Leaving that formal reception area, he passed to his arena, and caused to be sent out messengers to his students, telling them that the next day’s classes must be improvised in his absence, and that there would be a test later.

And then he did nothing in particular. He read another hundred pages of the textbook he had borrowed; it wasn’t very good, but then the book he had loaned out in exchange wasn’t very good either. He wandered from room to room of his house, idly checking various storages to see if anything had been stolen (a deck of cards was missing, but that was all). From time to time his thoughts turned to tomorrow’s challenge, and he let them drift. Not directing his thoughts at all, only blocking out every thought that had ever *previously* occurred to him; and disallowing any kind of conclusion, or even any thought as to where his thoughts might be trending.

The sun set, and he watched it for a while, mind carefully put in idle. It was a fantastic balancing act to set your mind in idle without having to obsess about it, or exert energy to keep it that way; and years ago he would have sweated over it, but practice had long since made perfect.

The next morning he awoke with the chaos of the night's dreaming fresh in his mind, and, doing his best to preserve the feeling of the chaos as well as its memory, he descended a flight of stairs, then another flight of stairs, then a flight of stairs after that, and finally came to the least fashionable room in his whole house.

It was white. That was pretty much it as far as the color scheme went.

All along a single wall were plaques, which, following the classic and suggested method, a younger Jeffreyssai had very carefully scribed himself, burning the *concepts* into his mind with each touch of the brush that wrote the words. *That which can be destroyed by the truth should be. People can stand what is true, for they are already enduring it. Curiosity seeks to annihilate itself.* Even one small plaque that showed nothing except a red horizontal slash. Symbols could be made to stand for *anything*; a flexibility of visual power that even the Bardic Conspiracy would balk at admitting outright.

Beneath the plaques, two sets of tally marks scratched into the wall. Under the plus column, two marks. Under the minus column, five marks. Seven times he had entered this room; five times he had decided not to change his mind; twice he had exited something of a different person. There was no set ratio prescribed, or set range—that would have been a mockery indeed. But if there were no marks in the plus column after a while, you might as well admit that there was no point in having the room, since you didn't have the ability it stood for. Either that, or you'd been born knowing the truth and right of everything.

Jeffreyssai seated himself, not facing the plaques, but facing away from them, at the featureless white wall. It was better to have no visual distractions.

In his mind, he rehearsed first the meta-mnemonic, and then the various sub-mnemonics referenced, for the seven major principles and sixty-two specific techniques that were most likely to prove needful in the Ritual Of Changing One's Mind. To this, Jeffreyssai added another mnemonic, reminding himself of his own fourteen most embarrassing oversights.

He did not take a deep breath. Regular breathing was best.

And then he asked himself the question.

Final Words

Sunlight enriched air already alive with curiosity, as dawn rose on Brennan and his fellow students in the place to which Jeffreyssai had summoned them.

They sat there and waited, the five, at the top of the great glassy crag that was sometimes called Mount Mirror, and more often simply left unnamed. The high top and peak of the mountain, from which you could see all the lands below and seas beyond.

(Well, not *all* the lands below, nor seas beyond. So far as anyone knew, there was no place in the world from which all the world was visible; nor, equivalently, any kind of vision that would see through all obstacle-horizons. In the end it was the top only of one particular mountain: there were other peaks, and from their tops you would see other lands below; even though, in the end, it was all a single world.)

"What do you think comes next?" said Hiriwa. Her eyes were bright, and she gazed to the far horizons like a lord.

Taji shrugged, though his own eyes were alive with anticipation. "Jeffreyssai's last lesson doesn't have any obvious sequel that I can think of. In fact, I think we've learned just about everything that I knew the *beisutsukai* masters know. What's left, then -"

"Are the *real* secrets," Yin completed the thought.

Hiriwa and Taji and Yin shared a grin, among themselves.

Styrllyn wasn't smiling. Brennan suspected rather strongly that Styrllyn was older than he had admitted.

Brennan wasn't smiling either. He might be young, but he kept high company, and had witnessed some of what went on behind the curtains of the world. Secrets had their price, always, that was the barrier that made them secrets; and Brennan thought he had a good idea of what this price might be.

There was a cough from behind them, at a moment when they had all happened to be looking in any other direction but that one.

As one, their heads turned.

Jeffreyssai stood there, in a casual robe that looked more like glass than any proper sort of mirrorweave.

Jeffreyssai stood there and looked at them, a strange abiding sorrow in those inscrutable eyes.

"Sen...sei," Taji started, faltering as that bright anticipation stumbled over Jeffreyssai's return look. "What's next?"

"Nothing," Jeffreyssai said abruptly. "You're finished. It's done."

Hiriwa, Taji, and Yin all blinked, a perfect synchronized gesture of shock. Then, before their expressions could turn to outrage and objections -

"Don't," Jeffreyssai said. There was real pain in it. "Believe me, it hurts me more than it hurts you." He might have been looking at them; or at something far away, or long ago. "I don't know exactly what roads may lie before you - but yes, I know that you're not ready. That I'm sending you out unprepared. That everything I taught you is incomplete. I know that what I said is not what you heard. That I left out the one most important thing. That the rhythm at the center of everything is missing and astray. I know that you will harm yourself in the course of trying to use what I taught. So that I, personally, will have shaped, in some fashion unknown to me, the very knife that will cut you..."

"...that's the hell of being a teacher, you see," Jeffreyssai said. Something grim flickered in his expression. "Nonetheless, you're *done*. Finished, for now. What lies between you and mastery is not another classroom. We are fortunate, or perhaps not fortunate, that the road to power does not wend only through lecture halls. Else the quest would be boring to the bitter end. Still, I *cannot* teach you; and so it is a moot point whether I would if I could. There is no master here whose art is entirely inherited. Even the *beisutsukai* have never discovered how to teach certain things; it is possible that such an event has been prohibited. And so you can only arrive at mastery by using to the fullest the techniques you have already learned, facing challenges and apprehending them, mastering the tools you have been taught *until they shatter in your hands* -"

Jeffreyssai's eyes were hard, as though steeled in acceptance of unwelcome news.

"- and you are left in the midst of wreckage absolute. That is where I, your teacher, am sending you. You are not *beisutsukai* masters. I cannot create masters. I have never known how to create masters. Go forth, then, and fail."

"But -" said Yin, and stopped herself.

"Speak," said Jeffreyssai.

"But then why," she said, "why teach us anything in the first place?"

Brennan's eyelids flickered some tiny amount.

It was enough for Jeffreyssai. "Answer her, Brennan, if you think you know."

"Because," Brennan said, "if we were not taught, there would be no chance at all of our becoming masters."

"Even so," said Jeffreyssai. "If you were not taught - then when you failed, you might simply think you had reached the limits of Reason itself. You would be discouraged and bitter within your disaster. You might not even realize when you had failed. No; you have been shaped into something that may emerge from the wreckage, determined to remake your Art. And then you may remember much that will help you. I cannot create masters, but if you had not been taught, your chances would be - less." His gaze passed over the group. "It should be obvious, but understand that you cannot provoke the moment of your crisis artificially. To teach you something, the catastrophe must come to you as a surprise. You must go as far as you can, as best you can, and fail honestly. The higher road begins after the Art seems to fail you; though the reality will be that it was you who failed your Art."

Brennan made the gesture with his hand that indicated a question; and Jeffreyssai nodded in reply.

"Is this the only way in which Bayesian masters come to be, sensei?"

"I do not know," said Jeffreyssai, from which the overall state of the evidence was obvious enough. "But I doubt there would ever be a road to mastery that goes only through the monastery. We are the heirs in this world of mystics as well as scientists, just as the Competitive Conspiracy inherits from chessplayers alongside cagefighters. We have turned our impulses to more constructive uses - but we must still stay on our guard against old failure modes."

Jeffreyssai took a breath. "Three flaws above all are common among the *beisutsukai*. The first flaw is to look just the slightest bit harder for flaws in arguments whose conclusions you would rather not accept. If you cannot contain this aspect of yourself then every flaw you know how to detect will make you that much stupider. This is the challenge which determines whether you possess the art or its opposite: Intelligence, to be useful, must be used for something other than defeating itself."

"The second flaw is cleverness. To invent great complicated plans and great complicated theories and great complicated arguments - or even, perhaps, plans and theories and arguments which are commended too much by their elegance and too little by their realism. There is a widespread saying which runs: 'The vulnerability of the *beisutsukai* is well-known; they are prone to be too clever.' Your enemies will know this saying, if they know you for a *beisutsukai*, so *you* had best remember it also. And you may think to yourself: 'But if I could never try anything clever or elegant, would my life even be worth living?' This is why cleverness is still our chief vulnerability even after its being well-known, like offering a Competitor a challenge that seems fair, or tempting a Bard with drama."

"The third flaw is underconfidence, though it will seem to you like modesty or humility. You have learned so many flaws in your own nature, some of them impossible to fix, that you may think that the rule of wisdom is to confess your own inability. You may question yourself, without resolution or testing to determine the self-answers. You may refuse to decide, pending further evidence, when a quick decision is necessary. You may take advice you should not take. Jaded cynicism and sage despair are less fashionable than once they were, but you may still be tempted by them. Or you may simply - lose momentum."

Jeffreyssai fell silent then.

He looked from each of them, one to the other, with quiet intensity.

And said at last, "Those are my final words to you. If and when we meet next, you and I - if and when you return to this place, Brennan, or Hiriwa, or Taji, or Yin, or Styrlin - I will no longer be your teacher."

And Jeffreyssai turned and walked swiftly away, heading back toward the glassy tunnel that had emitted him.

Even Brennan was shocked. For a moment they were all speechless.

Then -

"Wait!" cried Hiriwa. "What about our final words to you? I never said -"

"I will tell you what my *sensei* told me," Jeffreyssai's voice came back as he disappeared. "You can thank me after you return, if you return. One of you at least

seems likely to come back."

"No, wait, I -" Hiriwa fell silent. In the mirrored tunnel, the fractured reflections of Jeffreyssai were already fading. She shook her head. "Never... mind, then."

There was a brief, uncomfortable silence, as the five of them looked at each other.

"Good heavens," Taji said finally. "Even the Bardic Conspiracy wouldn't try for that much drama."

Yin suddenly laughed. "Oh, this was nothing. You should have seen my send-off when I left Diamond Sea University." She smiled. "I'll tell you about it sometime - if you're interested."

Taji coughed. "I suppose I should go back and... pack my things..."

"I'm already packed," Brennan said. He smiled, ever so slightly, when the other three turned to look at him.

"Really?" Taji asked. "What was the clue?"

Brennan shrugged with artful carelessness. "Beyond a certain point, it is futile to inquire how a *beisutsukai* master knows a thing -"

"Come off it!" Yin said. "You're not a *beisutsukai* master yet."

"Neither is Styrllyn," Brennan said. "But he has already packed as well." He made it a statement rather than a question, betting double or nothing on his image of inscrutable foreknowledge.

Styrllyn cleared his throat. "As you say. Other commitments call me, and I have already tarried longer than I planned. Though, Brennan, I do feel that you and I have certain mutual interests, which I would be happy to discuss with you -"

"Styrllyn, my most excellent friend, I shall be happy to speak with you on any topic you desire," Brennan said politely and noncommittally, "if we should meet again." As in, not now. He certainly wasn't selling out his Mistress this early in their relationship.

There was an exchange of goodbyes, and of hints and offers.

And then Brennan was walking down the road that led toward or away from Mount Mirror (for every road is a two-edged sword), the glassy pebbles clicking under his feet.

He strode out along the path with purpose, vigor, and determination, just in case someone was watching.

Some time later he stopped, stepped off the path, and moved just far enough away to prevent anyone from finding him unless they were deliberately following.

Then Brennan sagged back against a tree-trunk. It was a sparse clearing, with only a few trees poking out of the ground; not much present in the way of distracting scenery, unless you counted the red-tinted stream flowing out of a dark cave-mouth. And Brennan deliberately faced away from that, leaving only the far grey of the horizons, and the blue sky and bright sun.

Now what?

He had thought that the Bayesian Conspiracy, of all the possible trainings that existed in this world, would have cleared up his uncertainty about what to do with the rest of his life.

Power, he'd sought at first. Strength to prevent a repetition of the past. "If you don't know what you need, take power" - so went the proverb. He had gone first to the Competitive Conspiracy, then to the *beisutsukai*.

And now...

Now he felt more lost than ever.

He could think of things that made him happy, but nothing that he really *wanted*.

The passionate intensity that he'd come to associate with his Mistress, or with Jeffreyssai, or the other figures of power that he'd met... a life of pursuing small pleasures seemed to pale in comparison, next to that.

In a city not far from the center of the world, his Mistress waited for him (in all probability, assuming she hadn't gotten bored with her life and run away). But to merely return, and then drift aimlessly, waiting to fall into someone else's web of intrigue... no. That didn't seem like enough.

Brennan plucked a blade of grass from the ground and stared at it, half-unconsciously looking for anything interesting about it; an old, old game that his very first teacher had taught him, what now seemed like ages ago.

Why did I believe that going to Mount Mirror would tell me what I wanted?

Well, decision theory did require that your utility function be consistent, but...

If the beisutsukai knew what I wanted, would they even tell me?

At Mount Mirror they taught doubt. So now he was falling prey to the third besetting sin of which Jeffreyssai had spoken, lost momentum, for he had learned to question the image that he held of himself in his mind.

Are you seeking power because that is your true desire, Brennan?

Or because you have a picture in your mind, of the role that you play as an ambitious young man, and you think it is what someone playing your role would do?

Almost everything he'd done up until now, even going to Mount Mirror, had probably been the latter.

And when he blanked out the old thoughts and tried to see the problem as though for the first time...

...nothing much came to mind.

What do I want?

Maybe it wasn't reasonable to expect the *beisutsukai* to tell him outright. But was there anything they had taught him by which he might answer?

Brennan closed his eyes and thought.

First, suppose there is something I would passionately desire. Why would I not know what it is?

Because I have not yet encountered it, or ever imagined it?

Or because there is some reason I would not admit it to myself?

Brennan laughed out loud, then, and opened his eyes.

So simple, once you thought of it that way. So obvious in retrospect. *That* was what they called a silver-shoes moment, and yet, if he hadn't gone to Mount Mirror, it wouldn't ever have occurred to him.

Of *course* there was something he wanted. He knew *exactly* what he wanted. Wanted so desperately he could taste it like a sharp tinge on his tongue.

It just hadn't come to mind earlier, because... if he acknowledged his desire explicitly... then he also had to see that it was *difficult*. High, high, above him. Far out of his reach. "Impossible" was the word that came to mind, though it was not, of course, physically impossible.

But once he asked himself if he preferred to wander aimlessly through his life - once it was put that way, the answer became obvious. Pursuing the unattainable would make for a hard life, but not a sad one. He could think of things that made him happy, either way. And in the end - it was what he wanted.

Brennan stood up, and took his first steps, in the exact direction of Shir L'or, the city that lies in the center of the world. He had a plot to hatch, and he did not know who would be part of it.

And then Brennan almost stumbled, when he realized that Jeffreyssai had already known.

One of you at least seems likely to come back...

Brennan had thought he was talking about Taji. Taji had probably thought he was talking about Taji. It was what Taji said he wanted. But how reliable of an indicator was that, really?

There was a proverb about that very road he had just left: *Whoever sets out from Mount Mirror seeking the impossible, will surely return.*

When you considered Jeffreyssai's last warning - and that the proverb said nothing of *succeeding* at the impossible task itself - it was a less optimistic saying than it sounded.

Brennan shook his head wonderingly. How could Jeffreyssai possibly have known before Brennan knew himself?

Well, beyond a certain point, it is futile to inquire how a *beisutsukai* master knows a thing -

Brennan halted in mid-thought.

No.

No, if he was going to become a *beisutsukai* master himself someday, then he ought to figure it out.

It was, Brennan realized, a *stupid* proverb.

So he walked, and this time, he thought about it carefully.

As the sun was setting, red-golden, shading his footsteps in light.