The Fox 15

Chapter 15: The Paper on Poisson's Spot

Joseph didn't worry too much about winning or losing the bet with Napoleon. In his past life, he had seen movies about Napoleon submitting an article to the French Academy of Sciences. It seemed that Napoleon had written an article analyzing social issues, but it had disappeared without a trace. So Joseph felt reasonably confident that he wouldn't lose this bet.

However, preparing this paper required careful attention. In a normal research endeavor, experiments would come first. But for Joseph, who had time-traveled, experiments could wait. He needed to prepare mathematical tools for the subsequent arguments and calculations.

This was where things got complicated. The late 18th and early 19th centuries were a period of great mathematical advancement in France. During this time, there were mathematicians who sent shivers down Joseph's spine, even as a time traveler. Just thinking about Fourier, Laplace, and Lagrange filled him with dread, as if he were haunted by their mathematical prowess. And Fresnel's perfect explanation of double-slit diffraction was closely tied to these great yet terrifying individuals. If he attempted to replicate Fresnel's work directly, he would need several groundbreaking mathematical breakthroughs.

"Isn't this like the proverb 'To solve the problem of Korea, we need to solve Manchuria; to solve the problem of Manchuria, we need to solve China; to solve the problem of China, we need to solve the United States'? When did my approach start resembling the mindless methods of a Showa-era staff officer, creating bigger problems to solve smaller ones?" Joseph couldn't help but mock himself. Yet, considering the historical impact of this experiment and driven by his vanity, Joseph decided to write this paper. He would attempt to use the existing mathematical tools as much as possible. In principle, it was feasible, but the entire process would be cumbersome and convoluted, like trying to solve a multiplication problem with addition.

After several days of trying, Joseph realized that avoiding the yet-to-be-developed mathematical tools would likely require a much larger paper.

"Some necessary mathematical tools must be developed, or we can't really use addition to multiply, can we?" Joseph thought.

After nearly a month of painstaking work, bypassing some advanced tools and inventing some "simpler" ones, Joseph finally completed his paper. He looked at the thick document, satisfied, and said to himself, "At least I've managed to condense it by half. A single paper with both a breakthrough in physics and mathematicswhat a worthwhile experience. The only regret is not receiving real-world feedback."

Joseph transcribed another copy of the paper and sent one to be reviewed. The other he took to show Armand.

As soon as Armand saw the plethora of mathematical symbols in the paper, he furrowed his brows. "Joseph, what have you been up to all this time? So, it turns out you've been working on this. Well, I can make some sense of the beginning; you argue that light should be a wave, not particles, which is quite different from Sir Isaac Newton's view. Your experiment is intriguing. But all these symbols put together? To be honest, I don't understand a thing. Of course, this isn't meant for me, right? It's for my uncle?"

Joseph replied, "Yes, I'd like to hear Mr. Laplace's evaluation."

"Well, that's fine. Tomorrow is Sunday, and I'll take this paper to him."

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"Good morning, Mr. Laplace. Is there anything you need?" A waiter held the door open and asked the famous chemist and member of the French Academy of Sciences, Laplace.

"Ah, Marbeuf, is Mr. Laplace here today?" Laplace handed his cane to the waiter and inquired.

"Yes, Mr. Marbeuf, Mr. Laplace is in his office," the waiter replied.

"Very well, please bring a teapot of red tea to his office in a moment," Marbeuf requested before walking down the corridor toward Laplace's office.

"Of course, sir, I'll bring it to you soon."

Marbeuf reached Laplace's office door and knocked gently, but there was no response. He smiled slightly, knocked again, but still, no response.

He gently pushed the door, and it swung open. Inside, Laplace was sitting at his desk, bent over, shaking a quill pen and deep in thought, surrounded by scattered used pieces of paper.

Marbeuf didn't say anything; he walked over, pulled up a chair, and sat across from Laplace, waiting in silence.

After a while, Laplace dipped his quill into the inkwell once again but failed to write any numbers on the paper because the inkwell had run dry.

"Damn it! I should've gotten a larger inkwell." Laplace muttered, lifting his head, only to realize that Marbeuf was sitting across from him.

"Marbeuf, how did you get in here? How long have you been here?" Laplace asked.

For quite some time, Marbeuf had been Laplace's assistant, working together on determining the specific heat of various substances. In 1780, they had proven that the heat needed to decompose a compound into its constituent elements was equal to the heat released when those elements combined to form the compound. This marked the beginning of thermochemistry and another milestone toward the law of conservation of energy after Black's work on latent heat. So, their relationship was quite amicable.

"Oh, I've been here for a while. I see you've been calculating the 'Poinsot spot,' right?"

"Yes, Mr. Marbeuf," Laplace stood up, "Have you seen that paper? It's quite against our intuition. But, darn it, those experiments are impressive, especially the 'Poinsot spot.' Well, it seems this young fellow, a classmate of Joseph Poinsot, submitted this paper to the Academy. I think he's looking for the prize money. The conclusion, despite being counterintuitive, is supported by the experiments. I'd say, based on the experiments alone, it's worth at least six hundred francs, if not more."

"Just the new mathematical tools he introduced in the paper are worth something," Marbeuf commented, "But the notion of light as waves might be hard for many to accept."

"Hard to accept? Just because Sir Isaac Newton said light is made of particles?" Laplace shrugged, "Aristotle had plenty of misconceptions too. Do we expect Newton to be infallible like a pope

forever? You know, I've got a lot on my plate. The mathematics in this paper is extensive, and though he employed some shortcuts, the calculations are still daunting. I also have my own research, so I only verified his experiments and took a general look at his arguments. I haven't had a chance to delve into the mathematical details. In mathematics, I'm not as proficient as you, and when it comes to calculating speed, I doubt there's anyone in the world faster than you. So, I planned to ask you to verify it thoroughly. I didn't expect you were already on it."