HERE COMES THE SUN

The night breeze at Cape Canaveral is warm for late autumn, but not unpleasant. Regina finds a good rock to sit on by the light of her phone, brushes off the sand, and sits down facing the sea. I sit on another rock a few feet away from her.

The coastline around here has changed drastically over the past few decades because of the crazy climate changes and efforts to control greenhouse gas emissions. Who knows, what my butt is resting on could be part of some historical artifact from the days of Wernher von Braun.

I pull out a cold Cuban sandwichy thing from my bag and wash it down with my Seven Up. Never thought I'd be eating a late dinner in a place like this.

Turning off my phone's backlight, I let the starlight take over. My eyes gradually get used to the darkness. The winter constellations sparkle like jewels in the eastern sky over the sea. Achernar, the brightest star in Eridanus, twinkles just above the southern horizon, visible through gaps in the palm trees. The stars, at least on a human timescale, remain unchanged.

I notice her gazing at a spot in the sky just off Orion's left foot. I'm pretty sure which faint star has captured her attention.

"40 Eridani . . . around there, right?" I look up in the same direction. "Eridanus. I wonder if Mr. Grace included it in his homemade planetarium—well, probably not. It's a lesser-known constellation, I guess. Anyway, we can't see Achernar from San Francisco either."

"*He did*. It was definitely charted on there," she says, her voice soft but certain. "I saw it in his first-magnitude star lightning round. When I was about to answer, Abby beat me to the punch. I felt defeated, but I won in the nebula round after that."

"Oh, you've got a sharp memory, huh?" I'm pretty impressed. In my vague memory, she once was a very reserved girl. But it seems like she has actually a kind of competitive and tenacious side.

We were junior high classmates, and it's been twenty-six years since we last saw each other. Well, not that I'm here for any romantic reason, mind you. Her name just happened to be on the participant list for a meeting about a certain space mission, set to launch from the old Kennedy Space Center in two weeks. And that's it.

She's a tenured professor in infrared astronomy. I've been a wandering lab-coat guy bouncing between dubious biotech startups. Just a year ago, I finally landed a job at a decent biotech company, thanks to the Taumoeba boom. But perhaps because our fields are so different, or maybe because we got hyped up swapping Mr. Grace's anecdotes, we can chat like we're thirteen again.

Oh, no, it's not what you're thinking. Not like having awkward crushes on the girl in a tank top sitting beside me back then, or any kind of bittersweet stuff—they're firmly in the past for me now.

It's more the feeling of being back when we felt like we could be anything. Back when the scientific secrets Mr. Grace taught us filled us with wonder. Back when San Francisco was warm and peaceful.

Yeah. More nostalgic than romantic, I'd say.

"It's almost here," she says.

"Yeah." I squint towards where I think the launch pad might be. I can make out some illuminated tower-like structures way off in the distance, but I can't tell which one it is.

She dragged me out to this beach, while I was tired out after meetings that lasted from morning to night. She said she had something to talk about. I'm still not sure what it can be, though.

I glance at her sideways, waiting for her to start talking, and tilt the almost empty Seven Up can. Only a few drops dribble out. Well, yeah, a starlit picnic like this once in a while isn't so bad.

When we were in eighth grade, the world turned upside down. To be honest, I can hardly remember what life was like before that.

The sun dimmed. That led to the discovery of the Petrova line extending from the sun to Venus and Astrophage—and then, a manned interstellar mission to Tau Ceti, Project Hail Mary, was born.

I don't know how it happened, but somehow our junior high science teacher, Mr. Grace, got drafted into the project. I still remember a bewildered look on his face. Well, we thought it'd be just a temporary hardship. Once the launch succeeded, he'd be free to return—that's what we casually assumed whenever we saw him on the news.

But he never came back.

When we eventually learned that he was *aboard* the *Hail Mary* long after the launch, we instantly lost faith in what grown-ups say. No one ever told us that! It was a one-way suicide mission for the crew—only the four unmanned probes dubbed the beetles would come back to Earth after twenty-six years, but Mr. Grace and the others wouldn't. To us thirteen-year-olds, that all sounded like a cruel absurdity, no matter how much we were told they volunteered.

In the end, he left on his twelve-light-year journey. Without really getting a chance to talk to us. Time flies, and we now realize we've become those very "grown-ups."

Well, that doesn't mean we've been idle these past twenty-six years. Despite having to allocate most of our resources to dealing with climate change, pandemics, and military conflicts, humanity has done pretty well, I think. Contrary to the pessimistic predictions that half the population would die, we've managed to maintain about eighty percent so far. The ridiculous energy efficiency of Astrophage helped us store more food than expected.

But that's a sort of hard-won miracle built on much chaos and upheaval. There's a lot I'd rather not remember. Vast grain fields probably no longer exist on the North American continent. At Whole Foods, non-synthetic produce now comes with outrageous price tags. For a low-wage guy like me, Walmart's alternative foods are the only option. But hey, it's waaaaay better than fifteen years ago when the whole of humanity survived on just potatoes—

I suddenly recall the badge I noticed on Regina's jacket earlier today.

An emblem with a stylized rye.

The insignia of the *Consortium*—I recognized it instantly. The logo entrusted with humanity's hope.

"By the way," I say. "Are you involved with the *Consortium* on top of your university position?"

"That's right. I'm working on the Petrova Light Observation Satellites," she replies.

Hmm, infrared astronomy is all Greek to me. Well, I guess they have satellites like that. "Uh, yeah. I see. Sounds impressive."

"I'm talking about the three IR observation satellites, positioned at 120-degree intervals in a solar orbit between Earth and Mars," she elaborates. "You might know them as *Li-Jie*, *Olesya*, and *Ryland*?"

Ah. I've heard them before. Many, many times. The reporter's voice on the livestream kept repeating those names excitedly–the day they detected the . . .

Wow.

"Okay, yeah . . . it's coming back to me now," I say. "You mean the satellites that *detected the beetles*!"

"Exactly. Thanks to this project, I've been able to continue my astronomy work even in these rough times," she says. "Very little time for my own research lately, though."

Oh, yes, that's right—the *Consortium* was established specifically *for that purpose*. I recall it.

The Petrova Taskforce, including the renowned Eva Stratt, reunited to ensure the returning beetles would be captured without fail. I've forgotten the official name, but everyone simply calls it the *Consortium*.

In the middle of the chaos of nations merging and dissolving, they did everything they could to prevent the dispersion of people and technology. Through their extreme and desperate efforts, the three cool satellites were launched—they were named *Li-Jie*, *Olesya*, and *Ryland* in a bid for continued funding. They kept a twenty-four-seven watch on the direction of Tau Ceti, ready to pick up the Petrova light emitted by the decelerating beetles. The old Deep Space Network on Earth also patiently listened for any radio signals from the probes.

And finally, the twenty-sixth year arrived.

From there on, it's just as reported in the media.

The first thing detected was the light spot. The spectroscopic data clearly showed the distinctive signature of Petrova light. Further precise observations revealed that what seemed like one point of light was actually a cluster of three points.

Three! Three beetles somehow managed to return to the solar system! Three out of four. Not bad at all.

Their speed profiles suggested that their masses were slightly over the design specs. Yeah, at that time, everyone thought it was just an anomaly.

A few weeks later, the old giant antennas of the Deep Space Network began receiving burst transmissions from the beetles.

The whole world was thrown into an uproar. The chaotic global situation was completely swept aside.

Humanity has neighbors. *Just a dozen light-years away*.

And to top it off, the first human to befriend them was our very own Mr. Grace.

Can you believe it? My thirteen-year-old self would've flipped if he'd known that!

I know it sounds crazy, but apparently he met an alien engineer named Rocky from yet another star system, and they totally hit it off and figured out a solution together.

From the beetles came all sorts of data saved by him. Starting with video letters explaining what happened and his daily logs, there was everything about the amazing neighbors named Eridians. Everything about the incredible material called xenonite. Everything about the astonishing microbes dubbed . . . okay, I could go on forever. Anyway, there was a whopping five-terabyte "Taupedia" there.

"Amazing. You were there when they found the beetles?" I say, recalling the global excitement at the time.

"Yes. We made new discoveries every day," she says. "But you were thrown into the Taumoeba fever too, right?"

"Pretty much. Well, that's how I landed my current job—gotta be grateful for that."

Having received all the data from the beetles beforehand, humanity got a bit panicked by unexpected souvenirs: mini-farms full of Taumoeba. They were gently recovered in space far enough from the Earth-Moon system. We already knew Taumoeba isn't deadly to humans, and planetary protection protocols have been almost meaningless, but we didn't want them loose on Earth. It was a matter of mood, rather than science.

The descendants of these pioneering Taumoeba are what I now spend my days chasing after, like some kind of sheepdog. I work for a startup company that jumped on the large-scale Taumoeba farming project. I'm still not sure why they hired a drifting research misfit like me. I can just say I've pored over Mr. Grace's scientific papers more than anyone else on the planet, though.

For the past few months, we've also begun controlled seeding of Taumoeba on Venus. I've been swamped with work related to that.

"How's your 'Yellow Submarine' going?" she asks, referring to our makeshift Taumoeba-seeding vessel orbiting Venus. Its giant Taumoeba tank, wrapped in golden thermal blankets, really does look like a submarine.

"It's super-effective so far," I boast. "After all, we're making a direct attack on Astrophage 'nests' to eradicate them completely!"

“Excellent. Like some sort of interplanetary pesticide,” she remarks. “Our data also support it. The Petrova line has significantly dimmed. The sun’s luminosity has recovered to ninety-seven percent.”

“Wow. Awesome news,” I say.

It’ll still likely take decades more for the environmental and geopolitical situation on Earth to fully stabilize. But now I feel a simple sense of gratitude that humanity has made it this far against all odds.

“Indeed,” she agrees.

I sneak a sideways glance at her. In the starlight, I can’t quite make out her expression or intentions. Unlike me getting overexcited alone, she remains cool as a cucumber. Hmmm, am I getting closer to what she’s trying to tell me?

What common ground do we share?—Science. Mr. Grace’s science class.

Science would lead me to the core of the issue—just a hunch. Well, I’ll trust my gut, and Mr. Grace’s lessons.

“Remember learning about the Doppler effect? Back in eighth grade?” Regina suddenly asks.

We’re still just shooting the breeze. The night is deepening. The smell of the sea feels a little stronger. Achernar has disappeared below the horizon, and the Great Winter Triangle is now leaning toward the west.

“Sure do,” I say. “Mr. Grace explained it during our field trip to the Exploratrium. He used the sirens of downtown emergency vehicles as an example, right?”

After that lesson, those faraway sirens that used to freak me out at night actually became kind of fun. I remember that.

“Yes. The sound gets higher as the siren approaches, and lower as it moves away.”

“Yeah, I know. So what about it?”

“Well, it’s about the *Li-Jie*,” she shifts to talking about one of the Petrova Light Observation Satellites. “After the beetles returned, we repurposed it to observe the Petrova line in the solar system. But last year around this time, I got an idea. I wondered if I should try pointing it towards Tau Ceti again.”

“To Tau Ceti? To see its Petrova line?”

“That’s impossible,” she says. “The entire star system would fit into a single pixel. And, as expected, no change was detected in Tau Ceti itself. However, a few dozen arcminutes away from Tau Ceti, a point of light was captured. It was so faint our image analysis AI could barely detect.”

I frown. Infrared astronomy might as well be ancient Sumerian to me. “A point of light? Wasn’t it there when you were observing the beetles?”

“No. I checked all the past data, but there was no such point of light. It must’ve appeared during the few months we weren’t looking.”

“Could it be, like . . . a supernova in some faraway galaxy or something?” I ask a foolish question that anyone would think of.

“Impossible,” she immediately denies it, as I expected. “It’s a Petrovascope, after all. I mean, it’s designed to extract *only* monochromatic Petrova light. The spectrum of a supernova is not monochromatic. It’d be automatically filtered out.”

I shrug. “I see.”

But then, what the heck was it? Does she want me to guess? Or is she—hesitating about something?

Silence for a while.

“Okay, I give up, Regina,” I raise the white flag.

She sighs. “Still don’t get it?”

“Well, like I said, I’m no astronomer.”

“It’s not about astronomy. It’s engineering.”

“What?”

“That high energy output and monochromatic IR spectrum can’t occur in nature,” she continues. “It’s clearly an artificial light, the kind produced when a massive amount of Astrophage is converted to energy.”

Wait.

—*Artificial*?

“No way,” I gasp.

What she means is . . .

“Could it be that . . . you saw the light from the *Hail Mary*’s engines . . . from the solar system . . . ?”

“Exactly,” she replies simply.

Wow. All I can say is wow.

Holy cow. The *Hail Mary* was optically visible?!

I’ve never heard of such news.

“Whoa,” I hold my head in my hands. “But it’s twelve light-years away?!”

“Aren’t you aware of the advancements in Petrova spectroscopy over the past decade?”

Okay . . . right. Back then, humanity was in full-on survival mode, kind of going Petrova-light-crazy. They poured all their scarce resources into detecting Petrova light to catch the beetles. And at the cutting edge of that crazy tech has been none other than her.

“Plus, the amount of energy emitted as IR radiation from a spin drive at full thrust surpasses that from the sun’s surface by orders of magnitude,” she continues.

“Yikes,” I shake my head. “If that thing hit me, I’d be space dust in a nanosecond.”

Well, if it’s brighter than the sun, it makes sense we can see it.

She spouts off. “The width of the *Hail Mary*’s spin drives is only a dozen meters or so. But theoretically the *Li-Jie* with spectrometry and adaptive optics optimized for Petrova light is capable of detecting it. Much easier than direct imaging of exoplanets.”

My brain feels like it might overheat and start smoking. Hey, calm down, brain. It’s not definite yet. For example—maybe the *Hail Mary* wouldn’t be the only thing that gives off Petrova light?

“Hang on,” I say. “What about . . . the Eridian ship? Couldn’t it be from their engines?”

“I considered that. However the subtle fluctuations in luminosity indicated a precisely controlled output cycle of exactly four seconds. It’s unlikely that an engine made by a species with a different time unit and a base-six system would operate on a second basis. I concluded it was definitely human-made.”

“Hmm, that makes sense,” I say, impressed by her brilliance.

I think back to our science classes in eighth grade. Unlike other students who only got excited during experiments, she was skilled at patiently analyzing the messy data afterward, never boasting about her findings—just like now.

“Your discovery is incredible, Regina,” I admire her achievement. But at the same time, my intuition is telling me something.

She’s not done yet. There’s something else, something bigger, that she’s trying to tell me.

The story of the Doppler effect isn't over yet.

"But, you know," I stammer. "The fact means . . . "

I'm recalling the news abruptly announced by the *Consortium*—about half a year after the worldwide celebration of the beetles' return. The emergency press release, which shocked all of humanity, in February of this year.

Regina's observation was several months before that.

"Uh, you were the first one to notice that . . . the *Hail Mary*'s light was . . . "

I ask her nervously. I'm thankful for the darkness. If I could see her face well, would I be able to ask her this question?

"*Red-shifted*?"

After a short pause, I hear her voice quietly saying yes.

Light is a brutally eloquent thing.

Mr. Grace's lively explanation echoes in my mind—okay, when a wave source moves away, its wavelength gets longer, you know. So who can explain why the yelping siren sounded lower-pitched just now?—

He also gave us a fun fact. Light is a kind of wave too. In the case of light waves, the color shifts to the red side. It's called redshift.

According to her, the *Hail Mary*'s exhaust light showed a redshift.

It can only mean one thing.

The *Hail Mary*, with Mr. Grace aboard, is moving *away from* Earth.

Everyone knows that now, of course. But back then, no one was aware of it.

You see, Mr. Grace's logs stored in the beetles straight-up said he'd scored some fuel, so he could "*go back to Earth*!"

All of humanity was excited by this statement.

His log ended with a description of the beetles' launch preparations after parting with the alien engineer Rocky. So I assumed he was just sending the beetles ahead first, and would follow along at a slower speed afterward. I wasn't the only one—even the *Consortium* interpreted it that way

back then. After all, his ship must've been battered. They thought he had sent the beetles ahead at five hundred g's to deliver Taumoeba to us as quickly as possible.

None of us felt odd that *only* the beetles returned to the solar system. According to the *Consortium*'s calculations, with a comfy acceleration and deceleration at 1.5 g's, the *Hail Mary* should be back by next spring.

Humanity was utterly elated—until just one text file, disclosed in the *Consortium*'s emergency press release in February, revealed Mr. Grace's change of plan.

But she had seen it months earlier.

The decisive evidence that Mr. Grace was moving away from us. Our despair.

Before anyone else in humanity. Directly. With her own eyes.

I can't even imagine how she must have felt at that moment.

Regina, unaware of my worries, continues to speak calmly. "Just to be clear, when I say it's moving away, the *Hail Mary*'s heading is actually tilted about 82.3 degrees relative to the solar system. So it's basically moving sideways from our viewpoint."

"Sideways? But then . . . wouldn't the exhaust light be hidden? And there'd be no Doppler shift. Am I wrong?"

"True for a slow-moving object like a car downtown. But when something gets close to the speed of light, we can actually see its side. Ever heard of the Terrell rotation?"

She seems even more talkative than before. Hmm, maybe she wasn't as shocked as I'd thought. Admirably cool-headed as a scientist.

"Nah, I'm afraid not," I reply honestly.

"When a ship's speed reaches around 0.9 c, it appears almost like it's pointing its rear end about 60 degrees at us. Also the Petrova light can show some relativistic beaming. Moreover, the relativistic transverse Doppler effect also becomes non-negligible."

"Um . . . is that really a thing?" Relativity always makes me feel like I'm being kind of tricked. "But just a moment—you were like the Petrovascope filters everything except Petrova light? Can it detect red-shifted light too?"

“That’s factored in. The *Li-Jie*’s Petrovascope can fine-tune its detectable wavelength range,” she replies. “You know, even the beetles’ thrust light is affected by the Doppler effect.”

“Oh, that makes sense.”

Her logic is airtight.

“Of course, there are limits,” she adds. “By now, the ship’s acceleration has pushed it beyond the Petrovascope’s observable wavelength range. By next year, it’ll likely fade into the cosmic microwave background.”

“So you mean you just managed to catch it because it was just last year? You were really lucky,” I marvel. “How the heck did you come up with the idea?”

“At first, I was trying to detect light at shorter wavelengths than Petrova light, in the near-infrared range. But nothing was captured—so I tried imaging at various wavelengths for troubleshooting. Then by chance, a light spot showed up in an image taken at a longer wavelength. Far-infrared. That’s a laugh, really,” her tone sounds a bit self-deprecatingly. “It’d never show up in the near-IR, you know.”

A laugh? What does she mean by . . . wait. Something else is bothering me. “Shorter wavelengths?”

The wavelength of the wave emitted from an approaching object gets shorter—once again, Mr. Grace’s voice echoes in my mind. In the case of light, it shifts towards blue.

“Ah. Blue-shifted, you mean,” I say. “You were expecting the *Hail Mary* to be *approaching* . . . ”

“Yes. Stupid me,” she affirms my guess again, with a hint of frustration.

I’m at a loss for words.

She didn’t point the *Li-Jie* at Tau Ceti on a whim. She made elaborate preparations, right from the start, for imaging the *Hail Mary*’s approach.

Expecting the ship to be heading this way—for Mr. Grace to return—even factoring in its relativistic speed.

“Stupid? Not at all. Back then, everyone in the world thought the ship would return. You noticed the truth even before the news report. Amazing enough,” I say. Way too ordinary words.

“Thank you”, she says. “I was just lucky.”

No. It wasn’t luck. It was all thanks to her keen insight. Nothing else.

“If the ship were following the beetles, we should have already seen the deceleration light,” she continues. “Even if it happened to overlap with Tau Ceti, the Petrova light Observation Satellites’ annual parallax should have made it impossible for all three to miss it. But, no blue-shifted light was detected. People around me interpreted it as the worst-case scenario happening on the *Hail Mary*. They told me not to be down since it was . . . *that kind* of mission to begin with.” Quiet anger resonates in her tone.

“That’s horrible.” Some people could be so insensitive.

“I couldn’t accept it.”

“Yeah, I know,” I silently applaud her unwavering faith in the *Hail Mary*’s survival.

“I swore I’d find it. I directly lobbied Stratt and got her to allocate some secret observation time for me. Tried all wavelengths. And there it was—a point of FIR light showing a redshift.” She starts speaking faster and faster. “Couldn’t believe it. I thought there’d be a mistake in the settings. But no matter how many times I re-imaged, the result was the same. So I desperately searched for anything else I might’ve overlooked. Every nook and cranny of Taupedia and the beetles—and finally, at the end of last year. That’s when I found that note.”

What.

I gasp. “That note—you mean . . . ”

Something darn incredible has just been revealed. I’m pretty sure.

“Could it be . . . Mr. Grace’s—,” I’m stunned.

“Yes,” she replies. “The one that was disclosed in the emergency press conference.”

The newly uncovered file that sent shockwaves around the world in February—also known as the Grace Note. The hidden text file with the *latest* timestamp among all the data in Taupedia. That’s what eventually told us what happened to Mr. Grace.

The hastily written text contained only a few lines. In his usual humorous way, he explained that he was urgently heading to the 40 Eridani system to help his “friend” and wouldn’t be returning to Earth, but not to worry. I can still recite the entire text from memory. And I can’t forget Stratt’s pensive face as she read it at the *Consortium*’s press conference.

“You found that too?!” I’m so surprised I’m feeling numb.

“Yes,” she says. “We’ve not publicized the light spot or the redshift, so his note is the only public evidence.”

“Wow . . . just wow,” I mutter.

“It was just luck too,” she says. “Without the redshift, I might never have noticed the note even now. I mean, its file name was just . . . ‘New Text Document.txt.’”

“Oh . . . ,” I say. “That’s awful. I’d definitely missed it.”

“And it wasn’t even on the RAID array containing Taupedia. But on a separate USB stick. It was fixed to the beetle’s inner wall with duct tape over cushioning material, with ‘LOOK HERE!’ written on it in pen.”

“*Physically* attached?!”

“Yes. It was electrically disconnected. That’s why it wasn’t included in the beetles’ transmission data and was overlooked for so long.”

“Whoa.”

Holy cow. If she hadn’t found it, we might still be blissfully unaware, waiting for the *Hail Mary* to come back. That’s a terrible idea.

The whole humanity should immediately be grateful for her meticulousness and tenacity.

But, as far as I remember, Regina’s name was never mentioned in the news about the Grace Note. It was issued solely by the *Consortium*. As for *Le-Jie*’s data, they didn’t even release that they’d detected Petrova light, let alone the redshift.

“Well, not just amazing. That’s pretty darn incredible. Your work deserves proper recognition. Why not publicize it more? Prove those doubters wrong,” I say.

She’s silent for a moment.

“I can say something to the *Consortium*—”

She sighs softly. “Thanks, but it’s okay.”

“ . . . Regina?”

“When I read that note, how devastated I was—*you understand*, don’t you? In other videos and logs, he said he’d be back!”

I notice her tone starting to lose its usual calm.

“He was saying—‘Rocky gave me fuel. A really good guy. Seems I’ll be able to get back, so please stay safe out there, folks.’”

“Ah . . . ” I was an idiot. Insensitive.

“He missed San Francisco’s sea, sky, and hills,” she continues. “He dreamed of the day he could treat himself to Sally’s Diner’s two-egg combo, over medium, and splurge on buttermilk pancakes too.”

I clench my fists tightly, helpless to do anything but hear her out.

Her voice sounds slightly painful. “Yes . . . he was like—‘because I left my class in the middle, I’ll have to do it again . . . I’ll save the special Tau Ceti lightning round for last, so everyone, be prepared . . . !’”

Yeah, Regina is right.

The most fun part of my boring junior high life was Mr. Grace’s science class. Having been in the front row as impressionable thirteen-year-olds for his lessons and subsequent mess—it’s no wonder our lives were so deeply shaped by him.

He has no way of knowing, but a bunch of students from his class ended up in STEM fields. Besides Regina and me, Trang in Astrophage power generation, Theresa in greenhouse gas control, Abby who revived natural dairy farming, Harrison now leading the *Consortium* . . . Unfortunately, not everyone from the class is still with us. We’ve lived in bleak times. But still, we’ve been desperately working hard to restore humanity in their own fields. Driven by his “will.”

So just imagine how surprised and delighted we were to know he was returning in triumph to Earth! Of all the messages recorded in Taupedia about his Return To Base, the special video letter addressed to his former students was the ultimate surprise for us.

Regina must be another one whose life path was influenced by him.

Perhaps she was the first to find the beetles’ solo return suspicious. While even the *Consortium* was euphoric, she calmly tried to assess if the *Hail Mary* would be really approaching. But her hopes were utterly crushed. the wavelength shift wasn’t blue, but red. The ship wasn’t approaching—it was moving away.

Not sure why she didn’t publicize that major discovery under her own name. But she must’ve struggled a lot. She knows the validity of her observational data better than anyone. Maybe that’s why she couldn’t bear to have it become the deciding factor in confirming the grim reality—to be the one who made the biggest contribution to that despair.

But in the end, she searched for corroborating evidence as a scientist should. The reveal of the Grace Note was the killing blow to her hopes. Throwing in the towel, she opted to stay out of the spotlight and left everything to the *Consortium*.

Without the discovery of the Note, the world might have simply declared the *Hail Mary* missing, as the insensitive pundits guessed. It's sure the truth is definitely better than that. At least the ship is alive, heading to 40 Eridani while cycling its output every four seconds. Just as Mr. Grace intended. So objectively, it's not bad news at all. And in fact, most of humanity has accepted his decision as a heroic act.

But I painfully understand her disappointment.

Because I felt the same way.

I couldn't wait for the spring of next year when he was supposed to come back. A lot to tell. A lot to ask.

So, when I found out he wasn't coming back, I was truly shocked. So shocked I bawled my eyes out in the lab, overturning boxes of freshly sterilized pipette tips.

I have no right to complain about the file name. The other files in Taupedia were neatly organized. Even indexed. So it must've been a very unusual situation.

Mr. Grace must've found the crisis of his Eridian friend while en route to Earth. The timestamp of the Grace Note and orbital mechanics indicate it was likely the absolute last possible timing to turn back. The beetles were probably on standby, ready for release at any time, and late access to the RAID array might be impossible—that might be the case. I guess—he wrote a message in a hurry, saved it on a USB stick nearby, secured it inside the beetles with duct tape, launched them toward Earth, and then went back to save his friend.

What he did was right. Absolutely right.

He saved both of his friend and the world at the same time.

If it were me, could I have made that decision in the heat of the moment? No. I'd be in a dither. And finally, I'd miss both chances. Just like I am now.

“That’s why . . . that’s why I volunteered. For the Lateral Pass mission,” Regina’s voice snaps me back to the present. Her tone has regained its usual composure while I’ve been lost in sentiment.

The Lateral Pass.

In American football, a Hail Mary is a last-ditch long forward pass attempted by an underdog team. But such a play is literally a desperate, all-or-nothing gamble. A quarterback can throw a variety of passes. You can throw lateral passes as many times as you want during a game.

Not a one-shot Hail Mary bomb challenging Tau Ceti, but passes to the “neighbors” right next to us. Thrown again and again toward 40 Eridani to keep the game going alongside them. Humanity’s new interstellar round-trip mission—the Lateral Pass. It actually has a longer, more formal name, but we just nicknamed it that, inspired by the Project Hail Mary.

She takes a breath and continues. “Information about our sun’s luminosity will reach Eridani in sixteen years. By then, Mr. Grace will probably be in his fifties.”

“Yeah,” I nod. “Erid has high gravity. His body must be falling apart.”

“Right. So I don’t think he plans to come back,” she says. Her silhouette is all I can see. “We’ve been transmitting Earth’s data stream towards Eridani too, but again—sixteen-year lag, and who knows if its maximum output can penetrate the dense, hazy atmosphere of Erid.”

“Same in reverse. If he’s planned to send something from Erid to us, it’d be a sixteen-year wait,” I point out. Indeed, 40 Eridani’s luminosity, as seen from Earth, still hasn’t recovered.

“It’s too long. Can’t wait for decades from now,” she says. “So I’m going to meet him in person instead. While he’s still well.”

There’s a definite passion in her voice. “I’m going to chase down that gosh-darn redshift I found and *cancel it out* as much as I can. That’s the true reason I volunteered.”

Perhaps there were a bunch of people around the world with similar ideas, but probably for more practical reasons than hers.

The beetles' data suggest humanity and Eridians can hopefully stay cosmic buddies going forward. But a distance of thirty-five years round trip is way too frustrating. We need to visit them while Mr. Grace is still around to act as an interpreter. At least I don't think we can pull it off without him.

The sooner we act, the more beanbags we get—a universal truth we learned from Mr. Grace's lightning rounds. His lifetime is limited. We humans are more shorter-lived, impatient, and impulsive species than Eridians. And if we missed this chance, humanity would prioritize *internal* affairs over outer space.

So, we'll send multiple waves of envoys to Erid one after another, from now on—the Lateral Pass mission. And the parts for the first ship will be launched from this very beach in two weeks. The initial step for the eight-month orbital assembly process.

Regina was brilliantly selected as a member of the prime crew for the first flight. And me—well, I'm on the backup crew. Once the first expedition departs, its backup crew will immediately become the prime crew for the second expedition and start departure prep. Due to the relative positions of the solar system and 40 Eridani, we only have one launch window per year. This means I will also chase their trail a year after her.

I'm well past crying like a kid over the Grace Note these days. Instead, I'm proud of his decisive action and his unshakable friendship. So glad he was the one—the first human to visit Erid.

But Regina must have stronger intention for this mission than anyone else.

She's the first one to discover that frustrating redshift. That might be why she can't accept its existence. I totally get her desire to physically cancel it out with her own hands, and she absolutely deserves that right.

And I'm kind of glad she confided in me about that, as my comrade who once learned from Mr. Grace together. Her accomplishments should be more widely known, but for now, I'll respect her wishes and keep them our secret.

"Yeah. I know just how you feel. It might be our last chance to see him—and, you know, sorry about earlier. I said some insensitive things," I say.

We're both past the halfway point of our lives. The one-way ship time will be four and a half years, but we won't be able to see our families and friends left on Earth for thirty-five years. We're prepared for that too.

We won't use long-term coma. It's too risky. That's the most important lesson we learned from Commander Yáo and Ilyukhina, the *Hail Mary* crew members. Besides, this is not a suicide mission anymore. The passes we throw will come back.

“As one of his students, I know your disappointment, and your resolve. I’ve been there too. But I’m no match for your passion. You’re strong,” I honestly admire her tenacity. Her determination to catch up with our teacher using every bit of science she has. “You absolutely deserved that prime crew slot. Way different from me getting chosen by just a fluke.”

I feel like her gaze turns towards me.

“Don’t sell yourself short,” she says calmly. “Now you’re leading comparative astrobiology. The best successor of Mr. Grace’s pioneering studies. The world’s foremost expert on Taumoeba. Hold your head high.”

That’s a tad too much praise. Comparative astrobiology is a fledgling field, so even an average researcher like me can work at the cutting edge.

“Thanks, Regina,” I shrug. “Okay, well, it’s one of my few skills. Without that forte, I’d only be good at making mac ’n’ cheese.” It’s the only dish I can manage. Both macaroni and cheese are still substitutes for now, though.

“You know . . . you really are starting to sound like Mr. Grace,” she chuckles.

“Wow. Am I?! In what way?” Not so bad. Um, okay. Be honest. Yeah, I’m super happy. He’s been my hero, the one I’ve admired. Can’t stop grinning. “My face? . . . Nah, couldn’t be.”

“The way you talk, the way you think. Are these what happens when you play with Taumoeba every day?”

“Oh, probably. I do talk to my cute Taumoeba every time I culture them—okay, everyone. Today we’re going to split! First team to finish gets beanbags!” I try to imitate his tone . . . oops, did it fall flat? I can’t see her face well yet, but I feel like she kind of smiled a little. I hope.

And it’s almost true. That’s how I treat my Taumoeba every day. I mean, driven by the excitement I felt in his science class, *here I am* now. I’m pretty sure she’s the same way.

I shrug. “He’s been my role model. Can’t deny being heavily influenced by him.”

“Then I’m sure you’ll be a great teacher too.”

“Oh, will I? A teacher?”

“We’re the *last* generation who remember him directly. It’s our duty to pass what he gave to us on to the next generation. Including his way of thinking.”

After saying that, she gazes silently at the eastern sky where the astronomical twilight is about to end. The boundary between the Atlantic Ocean and the sky is faintly tinged with white, and the out-of-season spring constellations are losing their brilliance.

Soon, the nearest star to Earth will rise again beyond the horizon today. The ninety-seven-percent restored white light will fill this small biosphere.

Suddenly, a mellow guitar intro starts playing in my head. It's a song from nearly a century ago, embedded in the preamble of the transmission data from *George*, one of the four beetles. Must be the designer's prank, I guess. A passage that all humanity got tired of listening to every single time they received a chunk of data. The very same number that was once supposed to be included on the Voyager probes' Golden Records, intended for "neighbors" somewhere in space.

"Here comes the sun," I say, under my breath. "It's alright."

Humanity and our Sol will surely be alright, Mr. Ryland Grace.

Maybe the broadcast from *George* has even reached distant Erid, but we still want to tell these words in person. To our Mr. Grace and his friend, Rocky.

Thin wispy clouds and the leaden sea are faintly being illuminated. The wind calms. A flock of eager seabirds starts chirping loudly in the distance. I can feel with my whole body that the long, dark night is finally breaking.

When we share this song with our *first neighbors* who speak in chords and notes—will they understand what I'm feeling now?

That's what is now vaguely crossing my sleep-deprived mind.

Notes

This is a fanfiction of "Project Hail Mary: A Novel" (not the upcoming movie). It was translated by the author from the original fanfiction written in Japanese.

Original fanfic:

https://www.pixiv.net/novel/show.php?id=21842156