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Unfolded

Part Zero: You

We're lying under a blanket of stars on a bed of grass, and everything is beautiful.

This is one the few places left on the planet where starlight shines like this, and tonight it shines on your face. My finger traces your skin from freckle to freckle, like I'm a kid scribbling on one of those "connect the dots" sheets you'd find at the doctor's. Your eyes gaze upwards as I do so, and I know you're doing the same, drawing invisible lines between fireballs trillions upon trillions of miles away.

"What's that one?" I ask, pointing at a random direction in the sky.

"The bright one on the Great Dog constellation?"

"Yeah, that."

"That's Sirius, a detached binary system 'bout eight-and-a-half light years away."

"The hell is a detached binary system?"

"It consists of a red supergiant and a white dwarf, close enough to orbit one another, but far apart enough so that they essentially evolve separately as stars. I like to think of them like a dancing couple, but they're dancin' a tad far apart from one another cause they've had a row." Your quiet demeanor just vanishes every time you start babbling about the cosmos.

"Or maybe like a pair of fightin' siblings."

"Like a pair of fightin' siblings," you laugh, tackling me as tears of joy well up in my eyes.

"Getoff me Mark, ya bollox!" The cool breeze of the Irish countryside picks up, and it ruffles our hair as we roll around in the late-night-dewed grass.

"D'ya think they'll collide with one another anytime soon?" I ask, crawling out of your grip. You're panting from the effort, your cheeks flushed almost as red as your hair.

"What, the Sirius stars? Not a chance."

That makes me happy, for some reason. I won't ever tell you this, but sometimes I dream about the stars you describe to me. I fly towards them, around them and see them up close in all their cosmic magnificence, and think about how they're just as beautiful as you made them sound.

"But," you continue, "even if they do, it won't always be a bad thing, ya know? Supernovae create the birthplaces fer new stars, and generate heavy elements to infuse new life into our galaxy. It's not just the death of the star, it's also the birth of one." How does one just know all this stuff at sixteen, I think.

"But those two aren't going nova anytime soon?"

You smirk. "Not fer a hundred million years, at the least."

I don't know why this memory has surfaced in the interstellar emptiness, amongst everything. Maybe it's when it all began. Or ended. Or maybe that was when our parents died. Or maybe when I decided to get on that damned rocket. It's all so blurry, so mixed up like someone's thrown my memories in a blender and shoved them back in me. Here, alone, I can't tell what's up, what's down, what's before, what's after. The only thing I can make out, that retains some semblance of sense, is you.

Part One: Matter

Maeve opened her eyes to her dark, empty apartment. A glance at her alarm clock told her it was the middle of the night. She felt a tear roll down her cheek, taking with it the last wisps of whatever dreams of stars and constellations she was having.

Knowing she wouldn't get much sleep anyways, she pulled out a lighter and a half-empty Marlboro pack from her bedside drawer. She grabbed her hair tie from the nightstand, sitting on top of a stack of divorce papers, next to a framed photograph of her and a red-haired, green eyed man, arms around one another. Her eyes hovered on that image, and just for a second it seemed like the walls and floors unraveled around her, and she was flying all alone in the empty vacuum of space.

She blinked, and the room raveled back. She tied up her hair as she walked past piles of t-shirts, bras and Gap jeans strewn all over her hardwood floor, out to her apartment balcony. Despite the late hour, lights flooded the buildings around her, and looking down she saw cars scurrying below like luminescent ants. She lit the cigarette and took a deep puff, relishing its familiar pungence.

Lately she'd been out on this balcony at odd hours a lot, tracing the barely-visible stars for comfort. Along with the nicotine and the cool outdoor breeze, it usually helped calm her back to sleep. She turned her gaze upwards to the night sky in hopes of such a sight.

Instead, what she saw instantly woke her up: a star, sparkling and glowing, as bright as she'd ever seen on any countryside field. Brighter, even. Maeve had done plenty of stargazing in her life, so she knew better than most that this level of luminance should be impossible in the middle of a metropolis with so much light pollution. And yet it shone defiantly, as if daring the city lights to drown it out. It was so bright she rubbed her eyes and looked again to make sure it wasn't just a tired hallucination. But no, it was still there upon second, third, tenth inspection, twinkling mischievously with a bluish tint.

The following morning every news outlet in the world would report it as the brightest stellar event in human history.

"An astronaut?" you ask.

"Yeah, that's what I want to do."

"Alright, Maeve! With me down here and you up there, we'll be unstoppable together!"

You'd always been bright, far brighter than I could ever be. If you weren't rambling about stars you'd be scribbling nonsensical-looking equations on walls and windows I could never hope to understand. My friends jokingly talk about how I'm too dumb, too rowdy, too vulgar, compared to my brother. Maybe half-jokingly.

"Well, it's just a faraway dream for now, there's still A-levels and uni to finish first. And even after that, acceptance rates into astronaut programs are, well… astronomically small."

You start chuckling in that adorable high-pitched laughter.

"Okay I dunno if it's that fecking funny."

You beam at me, those gorgeous green eyes filled with hope and pride and everything good in the world. If only my aspirations were as noble and pure as yours, I think to myself. You embrace me, and some part of me tears up, I don't know with joy or envy. You were content with admiring the stars, and I wanted to reach out and touch them.

"Before we enter, I must remind you that the following discussion we're about to have is at the highest conceivable level of discretion."

Most of the time Maeve would've cast a nihilistic rejoinder, but the man's demeanor was concerning. General Vinod had always carried himself like a rock, with a proud stature and confident attitude. Today though, he seemed to have shrunk like a mass of kneaded dough, an invisible weight bearing heavy on him. And it wasn't just tiredness, no. On her first manned

mission, she saw this man stay up for 49 hours straight and then proceed to run a 5k before bed. This was beyond exhaustion; the General was scared.

Maeve simply nodded in response. The general pushed the doors open, and they were greeted by a slender, middle-aged, bespectacled man standing somewhat awkwardly with a notepad and soda can in hand, wearing a lab coat she thought was almost comically stereotypical. The room itself was a large auditorium, lined with folding seats and a massive projector screen took up the southern wall.

"Commander Walsh, this is Yusuf Fayek, our lead theoretician."

"Hello, Miss Walsh" He spoke with a thick Arabic accent, and apparently had never been taught the concept of an indoor voice. "I will not waste your time or my time with pleasantries, so we shall get started immediately. Nadia, lights!!"

On cue, the room lights dimmed and a projector flickered to life. Before the image was even cast on the wall behind them, Maeve knew what it was going to be. It didn't take a genius to figure out why a space agency had contacted an astronaut the morning everyone in the world was talking about a star glowing as bright as the moon.

"Sirius B," came Yusuf's voice. Maeve figured out what else was so odd about it: he talked as if he was constantly lecturing a college classroom. "Since 2:37 am GMT on November 7th 20X3, with a magnitude of -11.8, the brightest extrasolar object ever recorded."

The image looked like a shot of an exploding firework. Around an almost-white core, tendrils of pale blue light snaked outwards, each surrounded by a translucent bubble-like aura, like a memory fading outwards. It felt so nostalgic, Maeve thought, this portrait of a stellar corpse.

"All the media people are saying that the star has gone nova, which generally would be the only explanation for this level of luminance. But Commander, you know, I know, even this general here knows there is more to this."

Old conversations of stellar systems ran through her head: Sirius was a detached binary system. Sirius B, a white dwarf and the smaller of the two, could have never accumulated the amount of mass necessary for a nova, nevermind that its life cycle wasn't due to end for another 100 million years at the least.

"Let me show you what actually is going on." She could hear the wry smile through his words. "Look at these two light patches here." The image dimmed and zoomed in to show two concentric circles of barely differentiable bluish hues at the center.

"Spectroscopy shows the material glowing and burning in these patches is interstellar space dust, close to the star system. More interestingly, these patches came with a time delay. They showed up some few hours after the initial luminance increase from Sirius itself. So tell me, Miss Walsh, what does that mean?" Yusuf took a large gulp of his soda and burped loudly, awaiting an answer.

Maeve shrugged, not lifting her eyes off the dead star.

"Maybe I can paint a picture for you. Nadia, diagram!" yelled Yusuf. The blue orb was replaced by an image that was almost entirely black, save for a few specks and lines marked in orange.

"A one-to-ten-quadrillion scale image of our local star cluster."

It was astounding how much darkness there was. The stars showed up as barely two or three pixels on this gigantic projector screen, and even then they probably had to be exaggerated. Humanity was swimming in an ocean of emptiness they could never properly comprehend. Though she did not show it, goosebumps rippled across Maeve's back.

Four large circles were drawn with labelled arrows highlighting those areas. Three of them were grouped together in one corner; they were labelled Sirius B, Interstellar Cloud Collision 1, and Interstellar Cloud Collision 2. The fourth, near the center of the projector screen, was simply labelled Sun. Then came the death knell: a perfectly straight line, connecting all four points.

"It's a remarkable coincidence, ya know."

"What is?" I ask. Both of us have our gaze fixed upwards, waiting.

"The fact that total solar eclipses even happen at all. I mean, when ya think about it there's no good reason the two should have the same apparent size from down here. It's like 3 random points forming a line instead of a triangle; the chances are virtually zero. Our moon just happens to be 400 times smaller and 400 times closer than our sun, perfectly cancelin' out."

The sky begins to darken as the moon begins its transit, but I'm not even looking up anymore. Maybe it's not a coincidence, I think. Maybe those two were put in those exact places by the universe just so we could sit here and marvel at their dance.

"So if I'm understanding you right, the most likely explanation for this… is a missile?"

"Essentially yes," answered Yusuf, adjusting his spectacles. "Some projectile whose trajectory is unmistakably our solar system. The probability of a random astronomical event near us heading exactly in our direction is zero. The only possible conclusion is that it was made by intelligent beings."

Maeve glanced at the general. It clearly wasn't his first time hearing of all this, but even in the shadow of the projected pitch-black image his disturbed expression was discernible. She looked back at Yusuf.

"But… why?"

"That is a useless question to try and answer. Whatever made this has technology and logic millenia beyond us. Who can guess the reasoning of an intelligent species far beyond us on the Kardashev scale? It is like a squirrel trying to figure out why World War II started." His tone was so casual it was unnerving, even for her.

"But whatever this projectile was, it blew up Sirius B, no?"

"Mmm, not exactly. It does not seem to be a supernova, more just like a premature nova, based on the thin layers of stellar matter dispelled from the surface. Instead of an explosion, think of it more like a fire being blown around by a strong wind. The star itself will stabilize into some other structure in time, but any matter within a few light-hours will be incinerated and torn apart by some combination of radiation and gravity."

"How is any of this even possible?"

Yusuf shook his head. "You are asking a chimpanzee how a nuclear bomb works. My best guess is some sort of very large but very thin antimatter ring, generated by some circumsolar collider on the Sirius system, which has now begun to fold and direct itself towards us. How these beings have controlled this folding and maneuvering I have no idea, but would make for fascinating research."

"Sure." Maeve understood about half of that. "But if it can do *that* to Sirius, and it's on its way to our Sun…"

Yusuf nodded with a smile. "I can tell you more, in fact. The time delay between interstellar cloud collisions indicates that not only is this projectile traveling at 30% the speed of light, it is *accelerating*."

She did some rough calculations in her head. "So-"

"So," he interrupted, "If Sirius is eight-point-five light-years away from us, and if the light from it is reaching us just now, and the projectile is accelerating from initial velocity of point-three-c, we have-"

"Five years," she interrupted back. "Five years at best."

"And if the projectile does indeed accelerate up to lightspeed, we have less than two."

"Come on Maeve, yer acting like I'll be dead in a couple years or somethin!"

You have the sheepish expression of a child caught swearing for the first time. Which makes the sight of a cigarette between your lips all the more shocking.

"Just… fecking why, Mark? Why?"

"I dunno, the guys at work often go for smoke breaks and such, ya know? I usually never went but they invited me this one time and I thought I might as well have a puff and-"

"And now you're a fecking chainsmoker!" I don't know why I'm yelling. My heart is beating faster than I'd like it.

"Maeve, come on, what's gotten into you? You've been so agitated and con… just… concerned, lately." Your tone is cautious, like you wanted to say something else and stopped yourself. I guess that's my fault. I didn't mean to come off interrogating like that. "I have it with me like a couple nights a week to wind down. Trust me, I didn't see myself fancying it much either but I find it really helps me think and relax, 'specially when I'm stressed. Just… please don't be mad."

I wasn't actually mad. More just surprised, really. Envious, even. Even after knowing you for so many years, you shift and change and grow in ways I can't imagine. Maybe something about that frightens me. I try my best to not let it show, to keep it furled up tight. I stand silently in front of you for an eternity, and the room fills with the weight of our bated breaths.

Eventually, you notice me staring at the cigarette box peeking from your shirt pocket.

"Do…d'ya reckon I could try one?" I squeak out. You take a long time to reply, sighing deeply before you do.

" I dunno Maeve, isn't it not ideal for ya, with yer job and allat? You don't wanna inhibit lung capacity or blood oxygenation in yer line of work."

"Just one time. Just to try."

You tilt your head to the sky, pondering. After a few seconds, you pull out a Marlboro stick from the box. "Alright, but just this once. Just for you."

Maeve lit a cigarette and inhaled deeply, watching the end of the tobacco rod flicker orange and red. Her eyes lingered on the sputtering light, as if she could reignite it by will alone. The two

men in the room exchanged an awkward glance with one another, but they did not question it. She needs to have her reaction, they thought simultaneously.

"I guess they beat us to it."

"Huh?" came the physicist's question.

"I always reckoned we'd die at our own hands, ya know? People fecking each other over arseways. Turns out we couldn't even manage that."

General Vinod rubbed his eyes. "Yes, Commander Walsh, humanity is unfortunately far more socially primitive than one might hope. After millenia we have failed to stop bickering over the most nonsensical of things. Whatever this enemy is, it seems to demand we come together to face it within half a decade, being generous. No-one in this room is naive enough to believe that is probable. Once news of this is broadly publicized a hefty chunk of the population will likely deny the threat even exists. When word of costly, risky countermeasures gets out, we don't know what manner of hindrances we'll encounter."

"Right, so what's even the poi-"

"Therefore," the general marched on, "we need to be pragmatic. We need a plan for the worst possible scenario at the earliest possible time, in the most discreet possible manner. The point, Commander, is that it just so happens my personal beliefs and job demand I work tirelessly to save humanity. So do Dr Fayek's. Your job makes the same demand of you. The reason I called you here today was to ask whether your personal conviction does as well."

Maeve turned to Yusuf. "You just said we're like monkeys in a barrel. How do you plan to stop a lightspeed missile from annihilating our solar system?"

He reached into one of the pockets of his oversized lab coat, and fished something out, clenched in his fist. His voice drummed with excitement.

"With this."

He held his palm open, revealing a tiny metallic-looking object no larger than a marble. It was round, very round. As Maeve bent down to have a closer look, it was almost impossibly

spherical and lustrous, as if he was holding the Platonic ideal of a sphere itself. Despite its seemingly innocuous appearance from afar, something about the way the object sat in his hand and how the light interacted with it caused her spine to tingle. She got the sense she was looking at something forbidden, something humanity should never have touched.

She looked up at the physicist, his grin widening and eyes brewing with equal parts genius and delirium. He understood the silent question she was asking.

"This, Miss Walsh, is a neutron."

"Alright then Mark, what's all this with eleven dimensions?"

"Huh?" The rays of sunlight piercing the room make your red hair look like a river of copper. I make a mental note to run my fingers through them later, though you'll probably complain.

"In yer thesis, the section on… Dimensional Decomposition via… Relativistic Perturbation. I see the phrase 'eleven dimensions' come up a lot."

"Are ya telling me you don't have the energy to fold the laundry with me but you do have enough to snoop through my work computer?" you ask accusingly.

I put aside your laptop and snicker at the pile of clothes lying in front of you. "I'm so glad you understand, love. It feels good to be know-" A recently-folded jacket slams into my face before I finish my sentence. "You know, for a physics nerd you've got a surprisingly good arm."

"Give us a hand foldin' and I'll tell ya."

I come over to the bed and begin haphazardly folding. I know you'll just refold all the ones I fold 'incorrectly' anyways. "So," I continue. "Eleven dimensions. Explain yerself, cause I look around and I only see three fecking directions now."

You tilt your head to the sky to think. "That shirt you claim to have folded there, see that two-dimensional character on it?" You point to a grey and white Disneyland shirt faded to within an inch of its life, folded perfectly adequately, in my opinion.

"You mean Mickey Mouse? He's there sure."

"Except he's not two-dimensional, right? Not really. The fabric that Mickey Mouse inhabits is three-dimensional. We can perceive and feel its depth sure. But Mickey Mouse can't. For any and all practical purposes, he's living in a two-dimensional world."

"So… we're like three-dimensional Mickey Mice living in an eleven-dimensional t-shirt?"

"Precisely!" I love when you say 'precisely' all excited like that.

"Huh. So why does yer 'string theory' need these eleven dimensions then? Just seems like they're kinda lying about doing nothing, no?"

"Ah Maeve, you couldn't be more wrong! Dimensions give room for complexity. I mean, look at this sweater." You unfold the brightly-colored ugly Christmas sweater you just finished folding, and point to the snowman at the center. "Look at Frosty like so, with all his features and clothes and surrounding flakes. In two dimensions, the act of weaving itself is impossible, no? It's the third dimension that allows for all these complicated patterns and forms to shape! Likewise in string theory, the eleven dimensions make gravity pop out of the equations, magic like!"

I try to hide it, but my gut trembles as the weight of your words slowly dawns on me. Eight other dimensions that us three-dimensional beings could never see or interact with, folded up into the tiniest of spaces imaginable, describable only by opaque mathematical equations. It was like almost three more entire universes were hidden in those infinitesimal realms. How could anyone not be driven insane, constantly working with these thoughts in their head?

"By the way," you continue, " just because you've gotten me talking about string theory doesn't mean you can just forego yer textile organizational duties."

Of all the things you said, that was the most confusing. "My what?"

"Yer laundry, Maeve!" you say, before launching a pillow at me. I immediately retaliate with a barrage of previously-folded Gap jeans and underwear. We end up wasting the entire afternoon like that, laundry flying across the room, folding, refolding,…

"Did you say *unfolding*?"

Yusuf laughed. “You will have to forgive us Miss Walsh, physicists are notoriously uncreative when it comes to naming. But essentially yes, that is exactly how we made this.” The unfolded neutron… she wanted to say ‘glimmered’ in Yusuf’s hand, but it wasn’t even doing that. It was interacting with the ambient light in a way that defied intuition, reflecting, scattering and refracting light simultaneously, like a glitch in reality.

“You are very lucky to be seeing this. My research group has only been able to achieve this level of control in the unfolding process within the past week. We haven’t even completed a first draft of a research paper yet. Aside from us you and the general are the only two people who know about this creation. Its planned use was in micro-circuitry, can you imagine? And now it will be used to save humanity. You could call it a miraculous coincidence!”

“How the fuck did you do this?”

“You see, an ordinary neutron is a one-dimensional string wound up very tightly and compactly in 11-dimensional space. The specific structure and oscillation of the string gives the neutron its particular properties. All we have done is…pull on the knot a little, pushing it down a dimension.”

A lifetime ago, her Year 11 physics teacher had given the following analogy: a neutron, compared to the width of a hair, has the same ratio as a grain of salt compared to the Earth. What Yusuf Fayek was holding in his palm was the equivalent of stretching a single grain of salt out to make a sphere the size of the sun. Maeve figured out what else was so odd about the marble - it looked like it was almost hovering above his palm, like it wasn’t exerting any gravitational force or pressure at all. But of course it wasn’t, it had the total mass of a single neutron. With an outstretched hand in front of the black projector screen, this mad scientist looked like the God of an empty universe at his behest.

“So what actually is this… Dimensional Decomposition?” The image of an eleven-dimensional t-shirt had been stuck in my head the past few days and I’d become an annoying child, asking questions every other

minute, even during lunch. Despite that, you never fail to entertain my questions. Just another way you're far, far too good to me.

You slurp your spaghetti and tilt your head to the sky. After a few seconds, you bring it back down and begin twisting your fork in your plate, twirling up your pasta into a ball.

"So, this small ball of pasta, got a radius of about a couple centimeters you'd say, no?"

"Right."

"And if you take a two-dimensional cross-section of this, what's it look like?"

"A circle, no?"

"Precisely! So, our two-dimensional Mickey sees a small circle. Now, suppose I spread out the pasta like so all over the plate." You drop the ball of marinara-drenched pasta and begin spreading it all over your plate, forming a large, thick disc. "Now I haven't got room here, but imagine I spread it a lot, lot thinner, until it was basically two dimensional. What's a cross section of that look like?"

"Still… a circle?"

"But a much bigger one now! To two-dimensional Mickey, it looks like I've made it grow usin' a magic spell or somethin'. But all I've done is push it down a dimension, and it's suddenly a lot larger for him!" You bob your head as you talk in an adorable way.

"Doesn't that violate conservation of mass or energy?"

You shake your head. "The mass and energy was already there before, it was just rolled up tight like. The larger pasta circle would still have the same mass and energy as the circle before, it would just be spread out a lot more."

I pick out a chili flake stuck between my incisors, and stare at it in my fingers. "Suppose I brang this eleven-dimensional chili-flake to ya and you 'decomposed' it eight dimensions down, so it's actually just a three-dimensional object. How spread out would that chili flake be?"

You ponder, little calculations whizzing in your head, and finally say something terrifying.

"About the size of our solar system."

"Our current best plan," said the general, "which is looking like perhaps the only possible plan, is to take a small but dense chunk of matter out to the edge of the solar system, near the Oort Cloud. There, we unfold the matter to form two macroscopic objects: a massive collision ball, and a massive reflective sheet. The ball will trigger the collision early at the farthest recesses of our solar system, and the reflective sheet will ideally mitigate most of the radiation that will head Earth's way."

Maeve took another puff of her cigarette, which was nearing the end of its life.

"We need a human," barged in Yusuf, "to maneuver the ship, steer it to the correct location and activate unfolding at the right moment. The Oort Cloud is many light hours from Earth. If we tried to command and course-correct remotely there would be much too large of a time gap. Trigger too early, and the scale of the structure will not hold long enough before the neutrons start refolding. Too late, and… shit goes down, let's say."

Maeve continued staring wordlessly into nothing. The two men exchanged a look with one another. "Commander Walsh, you have likely already deduced this but I'll say it for the record: this is a one-way trip. The pilot of this ship will not survive the aftermath of the unfolding or collision."

She understood. General Vinod hadn't just picked any commander. He was well aware of her profile: recently divorced, living in isolation, no listed remaining kin. Maeve Walsh was a perfect suicide bomber. The general had already anticipated her response, and these reassurances were but a formality.

"Ultimately the decision is up to you of course. If you do not wish to go we will not fo-"

"I'll go."

She was met with a solemn nod from the general, and a grin from Yusuf. Maeve looked back at the inky black image on the screen. The picture of a universe littered with stars and light and gods and heavens that humanity had grown up with was a lie; an illusion of stargazing, nothing more. The reality was on the wall before her: trillions of miles of cold, empty,

unforgiving space. Somewhere in there, on a blue speck that didn't even show up, was a red-haired science nerd with sea-green eyes who preferred the Bayer stellar designation.

"I'll go," she whispered once again, to someone impossibly far away.

"I just wish I could cling to you forever," I mutter, clutching onto your arm in bed.

You stare at me pensively, your thoughts hidden behind a wall of viridescent irises. Even now, I can tell those eyes aren't looking at me, not really. They're somewhere far, impossibly far away. I wonder when you started looking at me like that.

"Maybe the universe is too large to cling to just one person," you say, before kissing me on the forehead and pulling the blanket over yourself.

Maeve threw herself on the bed the second she got home. It felt like every ounce of her strength had been sapped, and all she could do was lay on her blanket, a lifeless pawn of the cosmos.

Four days, they had said. In four days, they would launch, under the pretense of a "routine space-station stockpile trip", with only her, the General and Yusuf's small team of engineers being privy to the actual contents of the rocket. A desperate gamble, concealed from the rest of the world. How such a quick turnaround was possible, Maeve had no idea. The General's prescience and speed with which he put plans into motion was frightening.

She grasped for her phone on her desk. With shaky fingers, she sent one singular text message, after which she blocked the recipient. She proceeded to hop in the shower, turn on the hot water and scream until her voice gave out. She would end up sleeping right there on the cubicle floor, in a pool of slightly salty water. She dreamt of binary stars; a pair bickering and fighting yet still orbiting one another, unable to be together, unable to be apart.

Part Two: Collision

At 1:54 PM on November 11th, 20X3, four days after the first observation of what had since been dubbed "The Sirius Phenomenon", a man with fiery red hair and eyes the color of the Baltic sea darted out of an Uber towards the revolving doors of the Global Space Agency launch station.

I fight back tears, my breath ragged from the effort. Trails of salt water streak down your face uninhibited, yet with grace and chivalry. Fecking cinematic cryer.

"Stop it," I cry. "Stop it, stop it, stop it stopit! You don't mean that, sure. You can't. You don't want me to go."

"I do though, Maeve, don't I? It breaks my heart, but I do."

"Oh sir, you don't want to go in there, that's the way to the command cen-"

"I fucking do, though, don't I?" yelled the man sharply. Later that day he'd regret screaming at the kind receptionist. He blasted through the door, running as fast as his legs would carry him. It was 1:56PM.

"What… what do you want me to do, Mark?"

"I don't know, Maeve." Your voice is hoarse. "It's a big planet. Meet people. Find a boyfriend, a husband even. Find others to love and be with."

"I HAVE someone I love!"

"God, Maeve, I'll never stop lovin' ya neither. We'll always have one another, won't we? But this… we can't continue this forever. We can't ONLY have one another. We'll… we'll destroy each other."

The man arrived, out of breath, at a large, thin metallic door with the words MISSION CONTROL CENTER printed above them. Next to the door, a red light flashed, indicating it was locked. He slammed his fist to the door, feeling his bones reverberate from the impact, to no avail. It was 1:58PM.

"Why?" I manage. I've failed to hold back the ugly cries.

"Look at us Maeve. Do you think this is healthy? How many friends do you have? When d'ya last leave the house for somethin' other than work?"

"But it's... it's been like this our whole lives."

"That doesn't make it any better."

"Alalalah," came a voice from down the hall. "Stupid fucking micro-bladder, at a time like this too." It rang loud and was thick with an Arabic accent. A lanky, bespectacled man in a white lab coat speedwalked towards the door like someone who had just gotten a new pair of legs. He stopped in his tracks when he saw the red haired man, mouth agape. "You're M-"

"Get me the fuck in there!" he barked at Yusuf. It was 1:59 PM.

"Did I do something wrong?"

"No, Maeve, no you didn't. Really, you didn't. Please don't phrase it that like."

"Then why don't ya love me no more?"

"I DO, God. I do and always have and always will. I just love ya differently. We both loved one another a little too hard, and that wasn't a good way to cope with... with what happened."

The pair barged into the room, which was filled with people with labcoats and spectacles standing and sitting around desks cluttered with electronic equipment and stacks of paper. An orchestra of voices, beeps, clicks and whirs thrummed as they worked. At the front of the room

was a large projector screen with multiple images: a rocket; an assortment of graphs and charts, and in the corner, a red-headed, green-eyed woman sitting alone in a cockpit. Above, a large countdown clock displayed a timer, with 22 seconds left. 21 seconds left.

"Give me a proper fecking reason, Mark! Stop dancing around it, just say what you wanna say!" I know what you're about to say. I've known it the entire time, but I buried it long ago, along with all the guilt and shame, rolled up tight and tucked into the deepest part of me.

"Because-" Your following cry will be the first time I ever hear you swear.

"That's my fucking sister!"

His voice echoed across the room, met with turning heads and quiet confusions. But the countdown didn't stop, no matter how much he yelled for it to, no matter how many buttons he tried smashing at the closest desks to him. Mark Walsh could do nothing but watch Maeve take off into the stars, farther than any human had ever gone alone. He tilted his head to the sky, his mind knotting and unknotting in pain, confusion and despair.

I wanted to pretend like it was all a bad dream. That you'd take back everything you said the next morning and we could go back to how we were. That a week later I wouldn't find myself packing all my stuff, moving to another country, finding a husband like you said, leaving behind the only constant of my entire life.

I'll never forget the way I clutched you the night we found out the news. We were barely teenagers, then, too young to suddenly be told by a horde of strangers smelling of absinthe and asbestos we were in this world on our own. I held you all night and swore that we'd never be apart from one

another. That we'd come into this world as one and we'd stay here and leave here the same. I couldn't love anyone, not even my husband, the way I loved you.

Maybe you were right, though. Maybe my way of loving you wasn't the best way of coping. Maybe Mum and Dad would've been disappointed in us. But we were kids, and we were all we had. I don't regret a single second of it.

The following is an excerpt from a transcript of an interrogation of Dr Yusuf Fayek, conducted July 14th, 20X5, 18 months after the launch of Maeve Walsh.

[redacted] : How well did you know Maeve Walsh before selecting her for Project [redacted] ?

Yusuf Fayek: Not at all. I didn't really care who ended up piloting the ship my project was on, that was more the general's business. I was just in charge of handling the science of the unfolding matter. Which fucking worked, you remember? Your welcome, by the way, for saving all of humanity's asses.

[redacted] : And how well did you know her fraternal twin, Mark Walsh, before she was selected for Project [redacted] ?

Yusuf Fayek: Heh. You are talking about a 34-year-old Nobel Laureate whose research record was on par with Hawking. There is probably not a single physics undergraduate on the planet who *hasn't* heard of him.

[redacted] : Did you have any personal relationship with him?

Yusuf Fayek: The same level of personal relationship I had with Hawking, let me say like that.

[redacted] : I'll remind you, Dr Fayek, you could be facing criminal charges of treason and conspiracy. It is in your best interest to keep your answers direct and unambiguous.

Yusuf Fayek: You guys are not nearly as fun as the Bureau people.

[redacted] : Fine, do as you wish. Getting back on topic, the unfolding mechanism key to Project [redacted] was based in large part on Mark Walsh's theory of

dimensional decomposition, was it not? And yet you maintain you had no prior contact with him?

Yusuf Fayek: Correct, but it's not like I needed to call him up to ask him about it. His work is in his published papers, and that's what I used.

[redacted] : Were you aware of Maeve Walsh's relation to Mark Walsh before she was selected for Project [redacted]?

Yusuf Fayek: Like hell I was. Walsh is not a very rare surname. The fact she was related to THE Mark Walsh, fucking blowed my mind, I tell you.

[redacted] : The day of the launch of the Defender I rocket, did Mark Walsh say anything to you in private? Anything related to his suicide the subsequent week?

Yusuf Fayek: As I already told the police investigating last year, no. I met him for not even 30 seconds when I opened the door to the command center, and never saw him or heard him ever again.

[redacted] : Okay, Let's switch gears to Project [redacted] itself. When The Sirius Phenomenon was first observed, what was your hypothesis on its nature?

Yusuf Fayek: Any reasonably bright astronomer would have come to the same conclusion that I, and every other scientist around the world did: an antimatter projectile headed directly towards our Solar System. Of course, most of them figured it out slower than me.

[redacted] : Were there any other hypotheses entertained?

Yusuf Fayek: Not for long.

[redacted] : And what was the primary hypothesis with regards to the source of said projectile?

Yusuf Fayek: Aliens. Monsters. Sentient planets. There were many, and to be honest I did not really care. As I said, I was interested in the physics of the phenomenon.

[redacted] : After receiving the video footage from Defender I's unfolding 3 days ago, were you able to conclude anything more about the source or nature of the projectile?

Yusuf Fayek: Apart from that my baby worked and countered it and saved the entire planet - you're welcome, again! - no. And now if any alien bastards want

[redacted] : Do you have any hypotheses about why Maeve Walsh's face appeared on the face of the projectile seconds before impact?

Yusuf Fayek: Coincidence? Computer glitch? Holographic principle? Allah? I don't fucking know.

[redacted] : Project [redacted] was “your baby”, as you called it. How can you not know?

Yusuf Fayek: One thing you learn when doing physics, [redacted], is that the universe is more bat-shit crazy than you ever imagined.

[redacted] : Fine then. One more question: you’ve described the dimensional decomposition process as “tugging on a knot.” Is it at all possible to tug so far you invert the string?

Yusuf Fayek: Huh?

[redacted] : Could your unfolding mechanism turn matter into antimatter somehow?

Yusuf Fayek: Hmmm.

[redacted] : Hm?

Yusuf Fayek: Theoretically yes. But it would be like throwing a bowl of spaghetti on the ground and it exactly forming the shape of the Mona Lisa.

[redacted] : How do you mean?

Yusuf Fayek: A particle’s particular properties are determined by the specific shape and structure of the string it is made up of, correct?

[redacted] : Okay.

Yusuf Fayek: And for any particle, its corresponding antiparticle is also determined by the very particular shape and structure of the string it is made up of. In particular, its structure is EXACTLY INVERSE to its particle counterpart. If the unfolding mechanism did indeed fail, there are an uncountable number of ways the string could’ve been deformed. For it to deform in the exact way to become an antimatter counterpart… it couldn’t happen by accident unless Allah himself moved the heavens to make it so.

[redacted] : I see. Is there anything else you can tell us?

Yusuf Fayek: Yes. Those siblings were fucking cursed.

Part Three: Antimatter

"Charge, parity and time-inverted matter."

I blink at you, with a blank expression. "Great, now I understand less than before."

"Well "what is antimatter?" is a hard question! Not exactly answerable in a sentence." The muffled voices from the movie Mum and Dad are watching in the living room fill the silences between our whispers.

"Well it's Saturday tomorrow, isn't it? I've got time," I reply. We're barely 11 years old but you've already started sitting in on university physics talks, and I can tell today's one has been on your mind the entire day. "Plus, if you wanna be a Professor like Mum and Dad you'll have to teach, won't ya? So teach me."

You tilt your head to the sky, and grab a couple of those old light-up fidget spinner toys from your drawer before hobbling onto my bed. You grab an old 2054 Lonely Planet hardcover book and place the two near-identical spinners on top of it. You flick one of them, and it flashes rapidly as it spins in bursts of red and orange light.

"Suppose this is matter. Not just the object, but the spinning in and of itself."

I nod, and gesture for you to go on. You flick the other spinner in the opposite direction, and pulses of white and blue light emanate from this one.

"This is antimatter. Essentially the same, but a total mirror image." The two spinners whir quietly on the hardcover while I try to take in and process what you've said.

"Like twins," I finally reply.

"Like twins," you affirm. The flashes of red and white from the two spinning toys scatters pink across the room, blushing the walls. In their light I see your eyes smile with eagerness.

"So what happens when matter and antimatter come together?"

You place a finger on each of their centers, preserving their rotation, and slide them into one another's orbits. They near-instantly stop spinning with a CLACK so loud it makes me jump, and the room plunges into darkness once again.

"They destroy each other."

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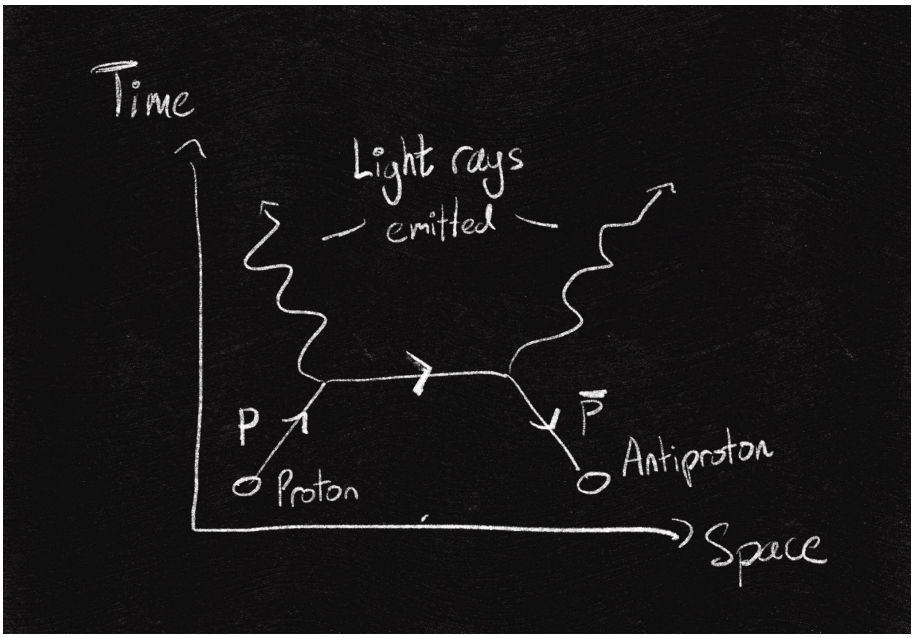
11 years after the birth of Maeve and Mark Walsh, world-renowned physicist Shi Jing Gao dotted her final stroke of Hagoromo chalk on a blackboard, marking the end of her lecture. She turned round to the jam-packed rows upon rows of seats and bowed her head slightly in thanks.

"A round of applause for our guest speaker!" came the announcer's voice through rusty speakers. A roar of clapping hands filled the room. "And I believe we have about 10 minutes left over for questions, if people would just like to line up behi- oh, I see they're already doing that. Well, fire away then, first question!"

Shi Jing Gao looked over to the microphone and was shocked: in a college auditorium full of undergraduates, graduate students and professors, the first person in line was a young boy with red-hair and green eyes who had to tiptoe to reach the microphone.

"I've a question about the Feynman diagram you drew there, the one for matter-antimatter annihilation." The boy pointed to a scribble on the leftmost chalkboard.



The diagram displayed the interaction of a proton with an antiproton. As was convention in Feynman diagrams, the arrow of the particle was pointed *towards* the annihilation point, and the arrow of the antiparticle was pointed *away* from that same point.

"The way it's drawn makes it look like the proton is taking a path to *become* the antiproton. Is that intentional?"

"You're exactly right." She resisted the urge to use the qualifier 'young boy'. She wanted to give this precocious mind the respect it deserved. "Indeed, when one applies the time reversal operator to many of the equations governing particle dynamics, we get exactly the equations for their corresponding antiparticles. Feynman himself suggested this was indicative of a deeper truth: that antimatter itself is simply matter traveling backwards through time."

The boy nodded, and quickly gave way for the next question in line. Watching his head of red hair disappear into the sea of undergraduates behind him, the physicist got the sense she would never forget this particular interaction.

Later that day, while eating in solitude on an outdoor campus picnic bench, Shi Jing Gao was greeted with the second strangest sight of the day: the same red-haired, green-eyed boy, striding towards her.

"Hi Professor, sorry for interrupting, I just had another question I wanted to ask."

"Not a problem," she said, finishing up her sushi roll. She endeavored to hide her surprise at this child's persistence. "I just so happen to be free at the moment. But might I ask, are you alone? Where are your parents?"

"They teach here. Philosophy. We live nearby, so I go to talks often after school finishes."

"Ahh, I see." A peculiar boy, he was, but as her Chinese father had told her decades ago, one had to be odd to be at the top. "Well, you have tracked me down, and so in reward you may ask your question, which I shall do my best to answer."

The boy took out a crumpled up piece of paper and unfolded it on the bench. On it was his own rendition of the chalk diagram of antimatter annihilation she'd drawn in the talk.

"You mentioned antimatter was, in a way, matter going backwards in time. So if I make a particle collide with an antiparticle and annihilate, from the antiparticle's perspective, it'll be like I created the antiparticle, no?"

A smile washed over the physicist. An embarrassing envy of this young boy's intuition piqued in her, and she didn't even care that he had come to pester her during her mealtime. For someone who was not even a teenager yet to have such a grasp of Feynman-Wheeler - the universe truly did have favorites. But such was the task of the elder generation: ensuring their youngers surpassed them.

"Right again. Allow me to take this logic a step further for you, for it is a concept that far too few fully wrap their head round, and I'm including my own academic peers in that. Here's a somewhat contrived scenario: suppose tomorrow I learned that an antimatter missile was headed straight for Earth. I have no idea the exact origin of its missile but I'm certain it could destroy the planet. Now suppose in retaliation, I fire my own missile of equal mass, made of

matter, towards it. They collide far away from our planet, producing large quantities of light and radiation. Annihilation, just like on the diagram you and I drew.

"However, time is reversed from the antimatter missile's perspective," she continued. "As you pointed out, the annihilation we perceived would be its formation. Are you following so far?"

The boy nodded, his widening green eyes betraying a hungering curiosity.

"Good. Now my question to you: who fired the antimatter missile?"

The young boy tilted his head to the sky. Shi Jing Gao could see the gears of his mind whirring as he did so, and an excitement stirred in her. Even before he spoke, she knew he would get the answer: "You did."

"Precisely," she replied with a grin. "This, of course, is completely counterintuitive, because how could I have fired something which launched before I fired it? But human intuition naturally delineates cause and effect into before and after, something the universe is not at all obligated to do. We do this because you and I are beings made of matter, sitting on a picnic bench made of matter, living in a cosmic bubble made of matter. A person made of antimatter would see the same chain of events we see, but in the opposite direction. Death for us is birth for them. And in the eyes of the universe, neither of these things are happening. There is no destruction nor creation when matter and antimatter collide; simply a particle turning into an antiparticle, taking a U-turn on the road of time."

In an ocean of darkness, in an incubator of asteroids and comets, in a crescendo of light, I am born. Memories from a lifetime ago sift through my brain. Maybe literally so. I feel so thin, so spread out, so frail, like an overused whisk. I open my eyes, and I see myself. A tiny, tiny version of myself, no larger than a dustmite's pinky, but I can see its face clearly. I can see its shock, its numbness, its boundless

anguish rolled up and folded in a tiny bag of flesh, afloat on a tiny ship of metal, a ship I'm being whisked away from at the speed of light.

Oh right, I'm moving. My mind perceives motes of space dust, whizzing past my face. It's cold, so cold, impossibly cold. As I'm pulled through clouds of iron and manganese and nickel, pinpricks and flashes of pain fill my body as they collide with me, leaving marks like-

Mark. That's right. Mark. I hope you're alright. I hope you live a long and happy life. I hope you don't hate me forever. You can hate me for a bit, just not forever.

Somehow I turn around, and far, far away in front of me I see two fireballs dancing with one another; a large red one, and a small white one. I don't know how but I know they are our fireballs, an old couple having a row, just like you described them. I fly towards them, a blanket of stars awaiting me, and everything is beautiful.