

Excerpt from Matters of Gravity p 244 to 251

(Another horrible disaster befalls the Bonn family – this one probably bigger than any other.)

But that was only the beginning of a cascade of calamitous events. At the instant the ball had struck Tommy and the loud gasp arose as though the arena was a single gaping mouth but before the ensuing silence, Margie had bounded up with hands to her face terrified. She tripped on the stair out of their box and tumbled all the way down the complete flight headfirst. Her crumpled and bleeding body lay lifeless at the bottom; she was unconscious. Everyone around them screamed and kept screaming even as ushers filed in and EMT's were dispatched to both sites. Roger and Maria were both remonstrating that her baby was at risk as well as Margie. It was amazingly quickly that they had her on a stretcher and were heading into the opening onto the concourse at that level. Maria and Roger ran along beside them and into the ambulance. Security had forced the crowds of onlookers away. Once in the crowded ambulance Roger could tell from the activities of the EMTs that Margie had died. His mind shifted gears quickly.

"Her baby!" he yelled. "Save the baby."

Maria was still down bending over Margie, speaking to her even though she too realized Margie was probably gone. She jerked her head around when she heard Roger's exclamation. "Roger!" she said, sobbing. "Roger, Margie's gone."

"I know," was all he could say, putting his arm around Maria to help her rise to a standing position where they embraced tearfully, swaying until they sat back down at the insistence of an EMT worker when the ambulance swerved as it rushed along, its siren blaring.

Upon arrival at the emergency entry to the hospital, activities intensified; the ambulance staff wheeled Margie out into emergency care. Doctors immediately surrounded her and rushed her into surgery. Convinced that they were concentrating on saving the baby, after a few moments of standing awkwardly Roger inquired at the main desk about Tommy. They pointed him to the ICU where Roger rushed, leaving Maria in a waiting room. A doctor came out to explain that Tommy was in extremely critical condition; they were afraid he probably could not survive the surgery that had to be done to afford him any chance of survival at all. The ball had shattered his skull and forced bone fragments and associated profuse bleeding in vital areas of the right side of his brain. They would keep Roger apprised of the situation.

He returned to the waiting room to wait with Maria. Lisa had arrived with her calming influence.

"How did you get here so soon?"

"You tossed me the keys when you went off with the EMTs," Lisa said. "I didn't catch them by the way, but I scrambled around, and someone helped me find them."

"You are heroic," Maria noted nervously. All these comments might have been humorous or cute at any other time, but no one did more than smile sympathetically.

Then as Roger was sitting down emotionally exhausted and relaying the dire news about Tommy's condition, he asked whether they had heard any information yet about Margie or her baby. No, they hadn't, but shortly a doctor entered to inform them that the baby had been saved and she seemed completely healthy. She!

Maria was sobbing with Lisa comforting her and then suddenly another major difficulty presented itself. Maria began moaning in pain; her contractions had not only begun but were continual. "Oh God," Roger muttered as he rushed to the receptionist for assistance with this new crisis. The same doctor who had announced Margie and Tommy's baby came rushing along with nurses and a wheelchair just as Maria's water broke. She was whisked away and down the hall to a 'birthing suite' in the maternity section with Roger holding her hand through the entire trip. What might usually have been a lower intensity chat during such a process to relax the expectant mother was instead a horrified silence with intermittent painful comment during each intensified contraction.

'Only child twins', 'only child twins', 'only child twins' – reverberated like drumbeats between his temples."

Indeed, two baby girls were born this day.

How does a story like this end? If this were a novel, the author would not know. These things happen; they are not written in DNA or in some plan laid out by an omniscient being. And it is not as if an author without empathy for fictional characters comes to a place like this and forgets his plan. There is no plan for things like this. They happen and when they do, any possible plan is destroyed as an integral part of the disaster. And the appropriate question is not how does this story end? It is rather how can this story continue? It is like a mathematical function with a singularity at location x_0 . The function makes sense right up to where one gets to x_0 from any direction. It's even okay at x_0 minus an interval, however small; the function makes sense. But at x_0 it makes no sense at all; it cannot be fathomed. The pencil or stylus can go no further. But the function still exists on the other side of x_0 – if one is interested in the function beyond that point, if one can get there.

23 GETTING PAST ANOTHER SINGULARITY

Despite its usual cataclysmic interruptions, life goes on after swerving out of its normal course. Well... for those for whom the bell has not yet tolled... life goes on and we are they for whom it does.

Lily and Eileen thrived as the newest generation of only child twins – more as sisters than any sisters ever had. Their parents thrived as well, although very differently than they had thrived before. Now, years past when other things had ceased to matter, the girls had begun school just yesterday. Routines would change in somewhat less dramatic a sense, but changes would accrue. Although the dedication of Maria and Roger's lives to the well-being and education of their girls was now immutable, still with their absence during designated hours, an adjustment would be inevitable.

Roger sat looking out over the reservoir, merely staring without immediate comprehension.

"Julie retires today, remember?" It was Maria breaking the silence.

"Yeah. Yeah, I do recall that she was. Today huh?"

"Yes. I just heard from her; she's sold her condo."

After too long, Roger responded. "What's she going to do?"

"She's coming up to visit."

"Oh. When?"

"Right away. She wants to check out those new condos north of town."

"That huge monstrosity overlooking the reservoir?"

"I wish you'd call it a lake like everyone else; that dam went in long before you were born. And they're condominiums. But yes, she's going to check them out."

"Why?"

"She likes us; we're friends; we used to be close."

"Aren't we close now? She shows up for vacations every year."

"Yes, I know – most years. We are still close, but don't you remember how we used to get so excited about merging electrostatics and gravitation and arguing about your three-down-quark electron."

"Nobody cares about any of that now."

"No one ever cared about it but us, but that's the point – we did."

"Yeah. Well... we never addressed the q factor."

"The q factor? Do you remember our last discussion on that topic?"

"No. We never discussed the q factor. Anyway, it's over."

"Julie misses it. Being Dean had never been what she had wanted of her career. She'd like to see whether we can get it going again. What's with you and the q factor? We addressed the higher level; we avoided spin initially."

Roger continued staring out across the reservoir but thinking now. "Well maybe it can't be addressed top down. We assumed spherical symmetry; spin isn't spherically symmetric."

“You’ve given up. Is that it? Do you remember our last discussion all those years ago now concerning the relationship between variances of the gravitational and electric charge distributions?”

“Yeah. Whether or not the gravitational variance was down at the Planck distance or the same as the electrostatic variance at the nuclear level.”

“You said there had to be a logical reason for all aspects of physical laws so I told you that you would have to come up with the logical rationale for one or the other.”

He chuckled. “Yeah. I remember that but some things don’t make sense.”

“Well, do you remember my contribution to that discussion?”

“Yeah. You suggested that there was no apparent reason why it couldn’t be an intermediate value just less than the electrostatic variance.”

“Yes. I’ve thought about that some off and on.”

“Have you?” He paused. “Was that while you were changing diapers or later while you were teaching the girls Italian?”

Ignoring his off-topic distraction, she answered, “No. More recently – in interacting with Julie on why she is so anxious to not be dean anymore.”

“Does the physics we were working on really matter to you... or her?”

“Yes, of course it does Roger. Doesn’t it matter to you.”

“No. Not like it did. I played baseball till I was tired of it and then I started getting into physics again, and then... well, then I started getting interested in baseball again... and then... life stopped and has barely started up again.”

“Ellie, Margie, and Tommy died,” she blurted out angrily and then she sat and watched him for a few moments. “We have to learn how to say it Roger.”

He turned his stare from out over the reservoir to lock onto her eyes.

“All those awful things actually happened Roger and we have to quit covering them with ellipses. They have names Roger: Your parents, Julie, Ellie, Jamie, Judy, Tommy, Margie, Lisa... the list will never stop Roger. It didn’t start there, and it won’t stop there.” She halted abruptly then, teary-eyed. “And would you please call it a lake Roger? Just for me! It’s a lake, okay.”

“Yeah, okay. I can do that much.”

“I want more than that. You don’t write obituaries for a living and you’re not a ballplayer either; you just hit home runs for a living for a while. Okay? You’re a physicist. I’m a physicist. We don’t have to say we *were* physicists, Roger,” she virtually screamed. “We *are* fucking physicists, okay? *Not* historians – we don’t write obituaries and no more morbid memories – not anymore. We have two happy girls, and we need to be happy for – and with – them. Okay? Now we go back to what we know how to do – what we did. Julie will help us do that – to get us over it and restarted. Okay?”

“Yeah, okay. I guess that’s a pretty good description of who we are and aren’t.” He grinned like he hadn’t in way too long, thinking about her passion. “So I guess we should reestablish whether we are indeed physicists before we start defining what kind of physicists we are since the girls will be home before long and we don’t use the f-word around them.”

“Yes,” she said, smiling now as well. “So what’s the logical relationship between the variances of the electrostatic and gravitational distributions? That’s what I’m asking.”

“It was your idea with which I happened to agree, so I guess the gravitational variance would have to be sufficiently small to lock two identical distributions from fragmentation but not so small that it locks disparate distributions so tightly that it precludes any further necessary recombination.”

“Roger, I love you.”

“Good. Maybe that’s a better adjective. Maybe we could just be ‘loving’ physicists. Wouldn’t that work?”

“It works great.” She sort of smirked at him then. “So, you did think about it some during these busy years between diapers, didn’t you? You thought about how your cute little-‘u’ up and little-‘d’ down quark could adhere until a second down quark joined the mix to form a ‘d-u-d’ neutron, didn’t you?”

“Yeah, I guess I must have. Are you wanting to secure our position before Julie gets here so we can stick together – adhere, I guess we could call it – when the other ‘d’ gets here.”

“No. I’m not worrying about that. I just thought it would be nice if we could familiarize ourselves with what we had going before. I found those old files in our database the other day. It was fun looking at them. Come over here and look at this figure we discussed last time we talked with Julie.”

Roger came over and pulled up a stool to sit next to her at the drawing table. As he inspected the diagram of the electrostatic and alternative gravitational forces on log scales, Maria pointed to where their second alternative would have to be modified to effect the overlapping of force curves. “It doesn’t have to be very much,” she said. Maybe if the gravitational potential is added to the electrostatic self-energy, that might be almost enough without much modification.” She paused and then appended, “Maybe that’s the logical reason for combining electricity and gravitation.” Laughing now, she said, “Isn’t that so Professor Pangloss?”

“You make everything seem possible.” He laughed with her.

“Well... thinking about this stuff again, there’s something that doesn’t make sense to me.”

“Oh yeah, what?”

“We were thinking that electric and gravitational charge would be directly additive, right?”

“Yeah. I think that’s where we were.”

“Well... potential is not energy without multiplying it times a charge, whether a unit test or an actual charge. The same goes for the field strength; it’s not a force until it’s multiplied times a charge.”

“Oh,” he uttered and paused as he came up to speed thinking about what she had said. “Yeah. So what about the cross products? Is that what you’re wondering?”

“Yes. We never addressed them, and I don’t see a role for them; they’re like ligers and tigons. They’re unnatural. So, I’m thinking that we probably are dealing with a product of generic charge with its complex conjugate. Right?” She paused. “Or maybe it’s like space and time in a spacetime metric.”

“Yeah. You’re right about requiring a complex value. But ligers and tigons?” He laughed. “I get it. So which one is the lion and tigress, and which is the tiger and lioness? Is gravitation the lion or the tiger? Is gravitational charge imaginary or is it real and electric charge imaginary? Oh, I guess the lesser must be imaginary – so the gravitational charge. Is that a lion or a tiger?”

“I think it may be even more complicated than that. Not only do we have the complex conjugate, but G itself has to be negative, so the root of G has to possess another root of minus one.”

“Then we just have the product of the sum and difference of the two charges – or... the two types of charge are noncommutative.”

“That’s it; isn’t it? Connes’s algebra.”

“Yeah.” He thought for a bit, “Connes?”

“Okay. So much for that.” She ignored his unfamiliarity with Connes. “Let’s look at that effect of having the variance of the gravitational charge just smaller than that of the electrostatic charge for a down quark,” she emoted as she opened a plotting window and put in the programmed formulations for the self-energy of a down quark. “There. Look at that.”

“Yeah, The button on the Lego, right?”

“Right. The logic behind indivisibility of fundamental particles.”

Seeming appropriately elated, but still withdrawn, he paused long enough that Maria looked over at him as he stared across the lake and then he asked, “Did you ever think about dropping the spherical constraint on the Poisson equation? And can a fixed distribution be rotating without effect? It would have a magnetic dipole, right? Spin. But would that change the distribution?”

Maria had started to remonstrate to the effect that attempting to solve the Poisson equation for a non-spherical symmetry would be impossible for reasons she was about to elaborate. But right then the girls came running in all excited and out-talking each other about the fun they had had at their first day of school.

Lilly was teasing Eileen about a boyfriend and Eileen responded immediately with, “You missed that easy word in the spelling bee.”

The family became the entire world again engulfing its separate parts, subsuming all its necessary accoutrements including the born-again physicists. So Rogen was denied the reasons for why a non-spherical symmetry would preclude solution of the Poisson equation. He wondered about those reasons desultorily then let it go.