

## Chapter Eighteen

Two O'clock was perhaps a bit early to hit the Royal Oak but Kay had said she needed to wind down after the service. Everyone was feeling a little worn and sank into their pints with pleasure. Carl reflected that a benefit of afternoon drinking was that you could claim a table which comfortably seated everyone. Andre started the conversation going and interestingly had been atheistically suffering through the service too.

"I find it a bit depressing that there's no secular way to mourn someone," he said, "Physicists at least should have found a way to free themselves from all the God speak." Paolo grunted in affirmation and Carl nodded. Only Kay seemed up for the fight,

"I thought the Dean did a very nice job. I find the religious stuff soothing. Physics and religion aren't incompatible anyway you know." Paolo snorted again at this. It was a provocation too much for him.

"Of course they are," he jumped in, "All that demonology and genealogy back to the creation have been banished by us. Religion is dead."

"No!" she retorted, "It's simple philosophy – experiments can never challenge belief systems. Science is itself a belief system; there's no logical, forced connection between observations you've made in the past and what happens in the future. You know all that stuff about how God could simply have set the world up a second ago – you can't disprove it."

"So philosophy is useless!" Paolo countered, "Look, I've never met someone who doesn't think it's dangerous to step in front of a car once they've seen someone knocked down by one. That's all the belief there is in science; you watch something, work out what's going on and assume it'll do the same again. We've explained everything that way and religion with its 'wind is a demon' and 'you've got to rip people's hearts out to make the sun come up' is dead. What's left is hiding in the holes – 'God happened earlier in the Universe than physics can so far explain' or 'he acts only when no one is watching'. Dead, dead, dead." Even Kay laughed at the end of the tirade. There wasn't much dispute from any of them.

"I don't know," contributed Carl, "I just can't understand how you pick your religion. It seems like there's an infinite set of religions where you can, say, get damned if you kill, or then not, if it's an infidel, or with an army, or in a cause you think is reasonable. Then you might have to worship on Sunday, or Monday or every nine days or once in a blue moon and so on. How do I know which set of arbitrary rules to follow? I guess you're supposed to 'look into your heart' and know the truth is that bread sometimes becomes immortal flesh. Damned if my heart knows anything about it though! Guess that's why all the new agey types just make it up for themselves!"

"Now you've reminded me of my mother," said Andre with a slight grimace. "She always asks 'How can you live in a world without a God?', as if I get to pick the

Universe I live in! Egotistical that is.” Everyone grinned again. Andre then added more seriously

“I’m coming to the conclusion that the idea of an after-life is the most evil thought mankind has ever had. You can use it to justify anything at all - kill, be nice, do the splits and you will go to heaven.” Carl wondered if this was Andre’s way of reflecting his feelings about Andreas. He was always a little too serious though.

“You’ve got to be careful though,” said Kay on a more conciliatory note, “we’re sounding like Richard Dawkin’s campaign against God. It just puts believers’ backs up and increases the divide. Religion does do a lot of good after all.”

“It’s fraudulent good though,” Paolo had no truck with any sort of compromise, “A Big Brother society could pump chemicals into the water that enforce charitable behaviour - no one I’ve met would support the idea.”

“Religion is a choice, not compulsory,” Kay bravely persevered.

“Not at my school it wasn’t,” Andre chimed in again, “Nobody said “Here’s a reading from the bible but remember you can choose to ignore everything in it if you think it’s stupid.” I was expected to nod wisely whatever ghost story came up.”

“OK, I agree schools should be secular,” said Kay raising her hands in defeat. Everyone nodded again in agreement on this point.

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The police’s computer guru was slowly packing his bag. A surprisingly large number of grey boxes and associated cables had been used to probe Andreas’ PC. The search was over though, and nothing more of note had turned up. WPC Thatcher, watching, considered that it was probably time for her to call an end to her investigation too.

She had just returned from briefing the Chief Inspector in town about her interview with Prof Sinclair. She’d almost expected him to hand her some shiny, coloured paper stars for her work, so pleased had he been. What Andreas had been up to in his home laboratory had been the outstanding question. Now all was clear and the case was as good as closed. She was pleased that she’d been the one to turn up the answer. The bookmark Andreas had been holding still slightly niggled in her mind, and also of course Carl’s mugging. Neither seemed strong enough to change the conclusions of the case though.

Through the window she saw a number of cars drive into the Phi’s grounds. The ceremony in town must have concluded. She wondered if it was worth the bother of talking to Prof Trant. It was generally considered in the police force to be a worthy thing to pursue suspects who had been economical with the truth so that in a future investigation they would not feel they could get away with lying and would be more helpful. Perhaps she should. She was also becoming exasperated about her continuing

failure to pin down Andreas' work. She would ask Carl, she concluded, for the quick précis when he returned.

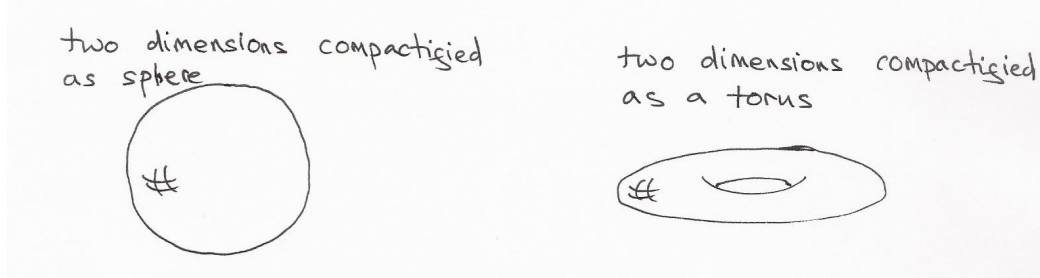
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The postdocs had settled for a second pint and more religion bashing. Paolo set it off again,

“Now if you're looking for religious belief in science, there's the string theory landscape.”

“Yeah, what is that?” asked Kay turning to Carl. Her work on the strong force was the most removed from string theory of any of them there.

“Well, string theory is a theory of quantum gravity but it lives in nine spatial dimensions. If you want it to describe the real world you have to get rid of the six you don't want,” Carl explained and everyone nodded. “You can wrap them up very small but there are lots of ways to do it. For example, if you compactify two dimensions, then when you move in those directions it can be like moving on the surface of a ball or on the surface of a donut, you know a torus with a hole in the middle, or lots of other possibilities. Now in everyday life you can't see these dimensions so any motion or oscillation of a string in those directions just looks like some intrinsic property of the thing in three dimensions. Thus every choice of compactification gives rise to a different three dimensional world.”



“So what chooses the particular compactification to give our world?” asked Kay

“Well, that's the point. For a long time everyone hoped magic would happen and all of our world would fall out but that hasn't happened. It now seems like all of these possibilities are equally likely.”

“So it's just random we ended up in our world?” queried Kay dissatisfied.

“See it's just religion – they've stopped trying to explain why the Universe is the way it is,” Paolo barged in.

“No wait,” interceded Carl before they leapt to conclusions, “in the whole infinite Universe there would be different bits that were like each of the possibilities. Why then do we see our bit of the Universe like it is?”

“Well?” they asked.

“The Anthropic Principle! That’s the idea that only in Universes with the correct conditions can life evolve to question why the Universe is the way it is. In most of those possible string theory worlds, everything is just a dull gas with nothing going on. The claim is that our Universe has to look like it does because we’re in it.” Everyone considered this but none of them seemed very convinced.

“It sounds very philosophical still,” said Kay cautiously.

“Sure but it’s an important observation about how the world could be,” continued Carl. “We’re expecting to find the Higgs particle. We’ve always argued it shouldn’t be light unless we find extra new particles to stabilize its mass. If they aren’t there, we’d have to pick our parameters to over 20 decimal places of precision to get our world. It seems too unlikely that we’d have been so lucky to get that number. We really need it spot on too, because if the Higgs was much lighter, radioactive decay would be very fast or equally if it was much heavier, we’d never observe the weak force at all. In both cases the interior processes of stars that make the elements we’re made of would fail – no humans!

Now though, imagine we do just find the Higgs and nothing else! Were we just stupidly lucky? Not in a theory like the string theory landscape of possible worlds – amongst those is every case. Only in the few with a Higgs of just the right mass do humans exist to look for it and be surprised. It’s an explanation of how that accident can happen and yet it be inevitable. If we do just find the Higgs then that’s a very important observation.

Well I think it’s a cool argument anyway!” His audience looked a bit glazed over. It had been a long day.

“I suppose we’d better go to work,” sighed Andre.