

Chapter Eight

Come Thursday morning Carl was still mulling over his encounter of the night before, even as he walked to work. He had taken to thinking of the man who had followed him as the ‘Tattooed Man’ with mental capital letters. Carl remained unsure precisely of what he could accuse the man. He was pulled from this reverie as he stepped through the Phi’s main door. Geoffrey Montford was just inside to intercept him.

Geoffrey had heard from the secretaries that the police had whisked Carl away into town the previous day and was eager to hear from a new source of information. Sat at his desk he had been able to watch Carl traverse the driveway, timing the moment to appear on the stairs, as if coincidentally, to perfection.

“Carl, how are you doing?” he asked, then lamented, “It’s a terrible thing.” Carl’s boss was emitting his usual aura of bonhomie reserved for the junior staff. Carl was always left with the disagreeable feeling that he was a slightly pampered pet. Still here was the source of his salary. Before Carl could conjure a response though his boss was on to his next question,

“Have the police made progress, do you know?”

Carl was somewhat surprised by the question since he had assumed the police would have briefed him. After his Tattooed Man conspiracies he had become a little wary. Then again, perhaps Montford should be expected to be rather keen for all the information he could gather, with the reputation of the Institute at stake. Carl provided a summary of what he had done the previous day though he made it general. He kept to himself details of the code and his speculations on forgery. Was he suspicious of Montford still or jealous of his own intellectual game? Montford opened his eyes wide at mention of alchemy and muttered “goodness” at appropriate points.

“He was studying historical books then?” mused Montford.

“Well copies of them.” Carl wondered about the man’s motives anew. Was he being probed on that point? Perhaps though, he was too wrapped up in a growing conspiracy theory of his own about a book by Newton. Montford seemed satisfied though and let him go with a request that Carl speak directly to him if anything disturbing came up or in any case if Carl felt he needed a period of leave. Carl headed on to his office wondering whether his quick response to decline a few days off had been the right one. The traditional stiff upper lip lived on and Carl’s instinct was always to deny the need for a fuss.

On the floor above, WPC Thatcher was sat on a desk corner in the office that had belonged to Andreas Born. The police computer geek was swinging smugly in the office

chair while she read the print out he had given her. He had highlighted several sentences in fluorescent yellow. First an e-mail from Norman Clarke to Andreas from six days ago:

Your latest paper's introduction of a mini-hierarchy in an electroweak symmetry breaking model without reference to my own work on the Higgs is simply scandalous. I demand an immediate re-write of the appropriate sections with a clear statement of first authorship.

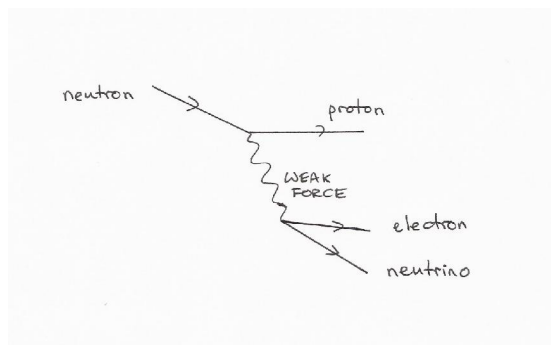
Then within Andreas' response

Your claim to first authorship is preposterous not least because the introduction of a mini-hierarchy is both trivial and unavoidable to anyone with half a brain considering the problem. I don't doubt untold authors had considered the possibility and barely registered that it was worth recording. I have no intention of succumbing to your bullying tactics.

The WPC sighed within. After reading the preliminary forensic report the previous night, she thought the case looked like it would wrap itself up as misadventure, leading to self poisoning. It seemed very likely that this correspondence was a distraction. She would have to follow up what was clearly a heated dispute though. So, she wondered, what on Earth did the first sentence Clarke had written actually mean? She tried to smile with good grace as she thanked her fellow officer and headed off in search of her preferred expert, Carl. It seemed a little late to worry about burdening him with so much of the investigative process.

“Can you briefly explain to me what an ‘electroweak symmetry breaking model’ is?” she asked once seated with Carl. He looked amused and appeared to consider for a while whether he could. He felt a little sympathy for the WPC – if she was really going to try to understand the work of everyone at Phi she might end up with a PhD!

“Well electroweak models are descriptions of the electric and magnetic forces but also the weak nuclear force. That's the force that is responsible for radioactive decay.” The WPC nodded.



“Why models and not theory?”

“Because we don't know the full answer yet. There are lots of ideas for what will turn out to be right, although they are all related to something called the Higgs mechanism.” The

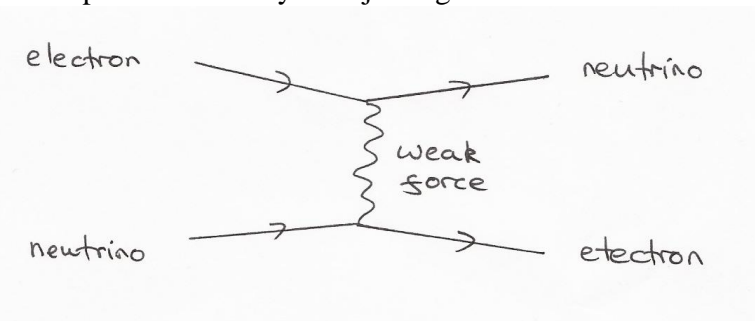
WPC mentally noted that ‘Higgs’ was another word she needed to pick up on and it was promising to have encountered it so soon, she hoped. “So, remember we talked about there being three copies of each quark and that the requirement that there was a symmetry between them generated the strong nuclear force?” Carl hoped something had stuck from the day before.

“Yes, I got the gist.” Carl smiled, a happy teacher,

“In the theory of the weak force the electron and the neutrino are treated as two identical copies of the same particle (as opposed to the three colours of quarks in the theory of the strong nuclear force). The symmetry between these two particles generates the weak force interactions.”

“Wait, how can that be? The electron has electric charge, so gets tied up in atoms, while neutrinos don’t interact at all and disappear off into the blue yonder, don’t they?”

“Ah yes! So that’s why the symmetry is broken. We need to explain that. But first let me assure you that the idea works. Assuming the electron and neutrino are the same does generate a theory of the weak force. It explains why electrons can change by the weak force into neutrinos since it’s an example of two identical particles probing each other to determine each other’s type. And it works – remarkably well – at an experiment called the Large Electron Positron collider the weak force properties of the electron have been studied to huge accuracy. This theory correctly predicts all the weak force properties to around one tenth of a percent accuracy. It is just right.”



“OK, I believe it works!” the WPC would allow herself to be bullied!

“So then why are electrons and neutrinos not identical? Well the idea, roughly, is that there are two possible states the Universe could be in. In one, the electron is bound in atoms and so forth whilst in the other, the two particles switch roles and the neutrino would look like the electron. So there is a symmetry between electrons and neutrinos, but it would only become clear if you had enough energy to switch the whole Universe from one state to the other. That’s an unimaginable amount of energy incidentally, so don’t worry about it ever happening.”

“So what is the role of this Higgs thing?”

“The Higgs particle is the root cause of the symmetry breaking. The electron and neutrino are different only indirectly as a result of their interactions with the Higgs, which is where the real action is happening.” Carl paused before re-embarking on his explanation,

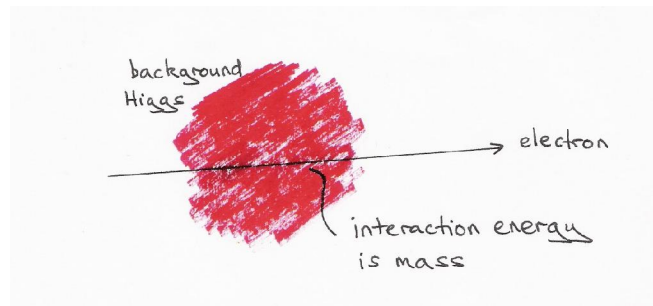
“So, we assume this particle exists, called the Higgs boson, and since it experiences the weak force, there must be two identical copies of it. Now, for some reason we only speculate on, the Universe likes to fill empty space with these particles. It can either fill space with one type of the particle or the identical other particle. Which one it chooses is random but that choice breaks the symmetry.”

“Why should space fill up with this stuff?”

“Well, presumably that’s just the lowest energy configuration so the one the Universe opts for. We don’t conclusively have a theory of all this yet, so I won’t offer an explanation as to why.”

“Well, OK but where is this stuff?”

“Everywhere! You have to remember this is a quantum theory. These particles actually have an equal probability of being everywhere. That makes it hard to see them because they’re just the background state of empty space. The reason we know they are there is that other particles passing through them, which interact by the weak force, get some energy as a result of the interaction. Energy is just mass and this stuff therefore creates all the particles’ masses!”



“But you don’t know this is true?”

“Well to see the Higgs in a detector you need to pump enough energy into some region of space to disturb the background. We haven’t made a powerful enough machine yet to do that so we can’t be certain. The theoretical understanding of this mechanism is pretty good though, so most people would bet on some variant of it being there in nature.”

“OK that’s enough for one session!” declared the WPC. “No wait,” she interrupted herself, “why do you need this new Higgs particle at all? Why not just fill space with electrons to make them directly different from the neutrino?”

“Electrons spin,” Carl responded, “Actually so do all the particles we’ve found so far. They’re like little spinning tops, rotating about some axis. If you filled space with those, then things would look different in the direction of the axis of rotation than in the

directions in the plane they are rotating. You'd weigh different amounts depending on which direction you move, for example! So that's no good. You need a new sort of matter that doesn't spin and hence doesn't pick out a direction in space. Hence the Higgs."

Invoking a new sort of matter, never seen before, seemed pretty radical to the WPC. She needed to digest the explanation. She also couldn't bring herself to raise the issue of "little hierarchies" that had been the centre of the e-mail dispute. She would try her new found knowledge out on Clarke and see if she survived. After she had excused herself, Carl was left wondering where her investigation could possibly be leading.

By late morning the sunlight was particularly glaring and Carl's office was already heating up fast. He was sat at his desk idly picking over the encoded entries in Andreas' diary. He had no clear idea how to attack the code so was half heartedly flitting from one possible code to another. Mathematical problems were like this, you had to spend a good deal of time getting the feel of the problem before you could really move forward. It was like getting your eye in on the colours of a picture before you could link pieces together in a difficult jigsaw.

Outside Carl's window, which looked off to one side of the Phi building, was an area of rhododendron bushes which marked the edge of the grounds. A small strip of lawn provided a walk way to the back of the Institute. The view brought to mind the sunny mornings like this when Carl had seen Andreas meandering past the building. Walking quietly really did seem to aid the mental digestion of problems, so many of the staff could be seen from time to time ambling around in the grounds. Andreas always used to head down the side of the main building and then disappear along the edge of the lake which Carl could just see one end of from his window. In retrospect, that was an odd route to take because the back of the lake was a reed bed and he wouldn't have been able to loop round. So what path did he follow since he didn't used to come back the same way?

Carl had been looking for an excuse to leave off his unproductive decoding and decided, in the spirit of enlightened enquiry he assured himself, to try to reconstruct Andreas' path. It really was quite hot outside so he kept as much as possible to the shade under the trees. The track along the lakeside was a sparse affair, half animal track, and clearly not often travelled. Carl glanced back and could see a number of groups of his colleagues sat out on the patio at the back of the Institute talking physics and enjoying the gardens. Shortly though he was entering the reed bed. The view back to the Phi was lost and the ground underfoot became damp and even slightly submerged in places. Progress was a little slow but it was at least cooler here.

The track soon petered out at the back corner of the lake. The Phi grounds were not so huge and here you could see where it backed onto other palatial homes. To the back of the lake was a brick wall that delineated the property to the rear. To the left was a large drooping bush that marked the back corner. Where to now then, Andreas? The only option seemed to be to duck under the bush's branches into a dark cavernous hollow

around its trunk. The change in the light, with the sun almost completely blocked by the dense foliage above, provided an almost magical transition. Carl was feeling rather like an exploring child. Now there was a thinner patch of greenery out the other side, as if indeed children frequently used this as a den.

Stepping out from under the branches left Carl dazzled by the return from the Stygian gloom. He blinked a little trying to see where he was - in the corner of a lawn of a large garden. Ah! This was Geoffrey Montford's house, Carl realized. The Phi's owner had chosen to build his sprawling mansion on the hillside next to his Institute. Carl had been here before at Christmas when Montford had invited the whole Institute for a soiree. The house was enormous, with lounges, libraries, and even a cinema. Behind the house was a large swimming pool and several terraces.

Carl's visual exploration was suddenly brought up short by the realization that there was a woman lying on a deck chair up by the pool. He suddenly felt a little embarrassed. What was he doing randomly trespassing into someone else's garden? This can't have been where Andreas came. But then where else could he have gone? The woman was at least fifty yards away but she must have seen him standing there. Should he just duck back the way he'd come? Perhaps it would be politer to explain why he was here and apologise. Well at least that way he could ask if the woman had seen Andreas pass through. It would have been just like him to have befriended the neighbours and be tromping through the whole locale on his walks.

The woman reclining on the sturdy wooden deck chair was wearing only a flimsy yellow bikini and a pair of dark sun glasses. Carl recognised her as Geoffrey Montford's wife although he couldn't remember her name. He had seen her at a distance a few times before and been astonished by her glamour. She was American and possessed that US sitcom, Hollywood beauty that seemed completely detached from the reality of women Carl had ever met. In public, her blond hair waved and glowed with a multitude of tints, she wore a perfect variety of delicate touches of make up and her dresses were always flowing and mysteriously supported. She appeared to be the perfect example of a trophy wife. Carl started to feel a little uncertain of himself as he walked towards her; it was like being in a movie but wondering what your script would say. It didn't help that she appeared entirely unconcerned by his presence, although she did sit up and start rubbing suntan oil onto her legs whilst looking in his direction. He hoped she wouldn't be too irate about his intrusion.

As he approached closer he could see that the woman (what was her first name again?) was beautiful even without make up. She had a long nose, high cheek bones and unblemished skin. Her suntan was deep and unbroken, although by now Carl was trying hard to concentrate on her face rather than letting his eyes wander elsewhere. It seemed to take an age for him to walk across the lawn and then the patio to get within talking distance. She must be in her mid-thirties Carl decided. The woman seemed relaxed to await his arrival and took a large mouthful of drink from a shot glass on the table beside her. There was also a half full bottle of gin and a bucket of ice carefully to hand.

“Ah, erm, excuse me Mrs Montford for intruding,” Carl finally blurted out a little too fast on arriving close enough. “It’s silly really. I’m from the Phi incidentally. I was trying to work out where one of our staff, Andreas, used to walk... and ended up here. He’s dead... you might have heard.” James Bond would have done better, no doubt.

The woman regarded him for a short period that left Carl growing increasingly awkward. “Carl, isn’t it?” she queried in a quiet but assured voice, with a distinct west coast US accent. Carl nodded amazed. Why on Earth would she know his name? Perhaps he had been introduced at the party. And he still couldn’t remember her name! “I thought the police might come asking questions but why you?” she continued.

“I don’t know really. Well the police got me to look through some of his stuff to tell them whether it was work. So I’ve just been thinking about it all I suppose. I realized I knew he came up here and wondered.” Carl offered. He was struggling to find a place to centre his gaze, not feeling confident enough to keep his eyes on hers and struggling to keep them off her lithe frame.

“Right,” she sighed as if having decided to undertake something unpleasant, “you want to know about Andreas.” She sat up and grabbed the suntan oil bottle before tossing it across to Carl. “Make yourself useful then.” She then proceeded to take another large swig from her gin glass and rolled over onto her front. Carl stared at the bottle of oil and then her ill covered and petite bottom in equal confusion. Her face was now away from the sun so she tossed her sunglasses over the back of the lounge to the ground. Her eyes were reddened and a little puffy from crying. Carl was wondering what on earth he had stumbled into.

“Andreas used to come up here and we’d fuck!” she declared abruptly. She was staring at him angrily, tears starting to run, daring him to express an opinion. She glared at the bottle in his hands and as a clear challenge reached round and undid her bra strap. The strap had only been a string but its absence across her back made the act all the more intimate. Carl was mentally reeling, so did as he was told and started to apply the oil. He thought he ought to be finding a way out of this, not further in.

“You think I’m a bitch,” she almost spat out, “but you’ve no idea what it’s like with Geoffrey away at his bloody physics institute all the time,” Carl was trying to keep his hands in the middle of her small back. Was she seducing him or was he taking advantage or neither? Carl certainly didn’t know. He was outside his usual world. “He spends all his evenings with his damned Historical Society too,” she continued apparently unaware of his mental struggles, “And why Winchester? He could have built his stupid folly anywhere in the world. Why pick boring, cold, wet, grey, middle of the countryside, England?” This description seemed a little harsh on the glorious summer day around them. She seemed to wilt a little under his hands as the anger subsided. She turned her tearful eyes on Carl and continued,

“Andreas just came by and we talked and it happened. He was nice, and it was a way of spiting Geoffrey and...” she looked a little lost, “It just made me happy. Now I don’t

even have that. I don't know why Andreas is dead, I don't know anything." Carl couldn't begin to think what to say to this beautiful, distraught stranger.

Then, a little bit of defiance returning, she turned towards him, "You do just think I'm a bitch don't you?" The movement seemed entirely natural, to match what she was going to say, and even later he couldn't bring himself to think it was deliberately provocative. There she was though, naked, her breast against his arm, tear streaked face looking imploringly at him just inches from his face. Thinking back later he thought he might just have said, "no" before they moved together.

Their coupling was fast and furious, animal passion, and wilfully thoughtless. They grasped each other's sun baked flesh, their mouths devoured lips, shoulders and breasts until accommodatingly they arched against each other for release.

Carl lay panting over the woman's stretched out form, slowly realizing just what they had done. Mrs Montford (Geoffrey Montford's wife!) seemed a little dazed too. She briefly studied his face then brushed her lips on his cheek and closed her eyes, her forehead against his. Another pause, but now Carl could feel the wind across his naked buttocks and began to realize just where he was; this was not private. It was a miracle the deck chair was still standing come to that! He eased himself to standing and reached for his clothes thrown aside in the tumult.

Mrs Montford peeped out at him from between her eye lashes then languidly stretched into a more comfortable position to rest. There did not seem to be much regret on her side. Carl still felt immensely exposed so struggled into pants, trousers and shirt.

"You look like you're leaving me," Mrs Montford said teasingly. She seemed to be at ease with seduction although there was still no air of planning. Carl waved his hands out towards the lawn and house,

"It's not the best place.." he excused. She smiled,

"OK," she paused. "If you want to tell the police about Andreas... well you should, don't worry." Carl didn't suppose that he would now. Was she playing him? His uncertainty must have shown because with a hint of tears again she added, "and if you want to come again, well it would be nice, really."

Carl leant in and kissed her – a faint smell of suntan oil and gin. She lay back and closed her eyes. Time to go. Carl took in a final vision of rounded breasts before turning and heading back down the lawn.

As Carl passed under the overhanging leaves and into the darkness amongst the bushes on the edge of the Phi grounds, it was like leaving some dreamland. Were his memories reality? Already he realized that the events were slipping away. Sex is instinctive and does not lend itself to graphic recall. Had he compromised his relations with Sasha then for a few blurred half memories of flesh and sun? Right then, he didn't think so. The

passion had been natural and so divorced from his true feelings that it all seemed outside his normal life. He felt empowered still by the adrenaline and endorphin rushes. To have been one of two adults choosing this mutual form of pleasure seemed an extra step forward in life, another adult initiation passed through. Surely the encounter could lie forevermore in the dreams it felt like it had come from.