Schöffling & Co.

foreign rights

author	Markus Orths
title	ALPHA & OMEGA Apocalypse for Beginners
original title	ALPHA & OMEGA Apokalypse für Anfänger
	© 2014 by Schöffling & Co.

English sample translation

translated by	Alexander Starrit
copyright for the translation	Alexander Starrit
contact	Schöffling & Co. Verlagsbuchhandlung GmbH Foreign Rights Kaiserstraße 79 60329 Frankfurt am Main Germany
	www.schoeffling.de

((pp 240-244))

4.

Sabrina Steward's passion was still for physics. More so than ever. Through the day and also in all the nights she spent alone she was fully occupied with her experiments and her thoughts. But she was, so to speak, being pulled in two directions.

On the one hand, she held down a squeaky-clean career as a particle physicist. She was obsessed with these particles, had, as it were, studied with bated breath and had in the course of her studies become ever meeker in the face of the particles' shrinking, something begun by the atom – which was actually and literally supposed to be indivisible – via the protons and neutrons and the circling swarms of electrons whose existence had long since been demonstrated. But then it had soon been discovered that protons and neutrons do not represent fundamental, minimally small particles, either, but that every proton consists of two up quarks and a down quark, while a neutron consists of two down quarks and an up quark (the word quark having been taken from James Joyce's Finnegans Wake). Later, they found the ghost-like neutrinos that had already been predicted by Pauli in 1930 and for which the first experimental evidence was found in the 1950s, oh, and all the muons ("Who ordered that? We don't need that at all!" exclaimed one of the physicists who discovered the muon, which was two hundred times heavier than the electron and no use to anyone), and the tauons and muon-neutrinos, the tauon-neutrinos, the charm quarks and the postulation of the strange quarks – which was made because the charm quark meant that certain inconsistencies related to the particles' charge could be very elegantly taken out of the equation (and elegance has always been considered the "cornerstone of any nutritious physical theory") – then the photons, the gluons, the W bosons, the Z bosons, all the particles that hadn't yet been observed – although you couldn't really observe any of them, only the effects that resulted from the collisions of other particles, something from which all manner of unknown particles could be inferred.

Sabrina devoted herself lock, stock and barrel to the drive towards symmetry in theoretical physics, which used the (entirely possible) fact that electrons orbit themselves at a fixed speed to develop a supersymmetry according to which it was logical to propose, alongside the existence of known particles that had not yet been observed, any number of unknown particles which had naturally not yet been observed either, the supersymmetrical partners, the supersymmetry (S) particles, super-electrons = Selectrons, Sneutrinos, Squarks, photinos, gluinos, winos and zinos. An explosion in the amount of particles, which Sabrina was lucky enough to live through, an era of revolution in physics, furthered by, among others, the gigantic project called CERN: while there were still fewer than twenty particles in 1951, by 1968 there were already almost eighty! But all that mishmash still yearned and strove in the physicists' heads towards a single, unified, global theory that would order this unordered situation: the field theory, the TOE, the famous Theory of Everything. The most promising candidate for that was superstring theory. The particles, which displayed, in one way, the properties of dot-like entities and, in another, those of waves, were turned into strings (to see which, it was said, you would need an accelerator the size of the Milky Way), but they simply had to be there, these strings, because it was so beautiful and clean, string theory, which later became M theory because the strings seemed to exist in the form of Ms: hilly, M-shaped apparitions. And for, in part, aesthetic reasons, physicists could not tolerate the idea that nature hadn't indeed realised all the symmetries available to her. Sabrina wanted to revolutionise physics and danced along in the particles' ethereal dance; she researched, she experimented, evaluated, projected and recomputed, called into question the thirteen dimensions of space that had to exist if M theory was to prove fruitful; she presumed, postulated, theorised, and came to public attention at the end of

2016 when she opened up a wholly new perspective on M theory and evolved it into a fifteen-dimensional W theory, which provided unprecedented and extremely fertile-seeming insights into the nature of these swirling strings. All this was one side of Sabrina. Let's call it the sober, rational side, one turned towards the discoveries and largely serious theories of academic physics, even if a layman would surely see it differently.

But there was also a second side. The intemperate. The dreaming. The Science Fiction side. That had not gone silent, either. In Sabrina's head and heart. She kept a diary. To be precise, she kept two diaries. (In the first, which interests us less right now, she had scribbled out her sexual adventures and so possessed a very precise number- and event horizon for the black holes of her own body, knowing that at the start of the year 2017 she had reached 999 men [which sounds colossal, but – upon closer examination – is only thirty guys per sexually mature year, i.e. two to three per month; you could say she had a certain addiction to sex, but whatever, I understand where Sabrina was coming from], that is, 999 men over the course of her life whom she had – as she put it – devoured, so now she was waiting for man number 1000, and he, Sabrina had decided, he was to be a very special man.) In her second secret diary, however, which is what concerns us here, Sabrina had typed and collected (this book lurked in her computer) all the ideas, thoughts and reflections relating to her real passion that had ever gone through her head or been somehow encountered in her life. And this true passion was still a childish one. It had not changed. It was: time travel! All the possibilities of exploring other, alien times! Which was no longer a problem since the theory of relativity. An entirely accepted standard opinion in physicist circles. But how? Black holes! The as yet unsolved riddle of the enormous black holes in outer space would be the key to any attempt to travel through time. Granted, no one had ever even observed a black hole itself (how would you? the things were invisible), but only the radiation fizzling out at their event horizons, or at what were taken to be event horizons. But if someone in outer space was dangling in front of a black hole, so said the established theory, if someone was dangling, say, three centimetres from the event horizon of a black hole, the black hole's gravitation fields would effect a distortion of time. Given a black hole with a mass of just ten thousand suns, Sabrina's watch would tick around ten thousand times more slowly when three centimetres from the black hole than it would in the same time on Earth. So if Sabrina dangled three centimetres from the black hole for a year, then on Earth, should she manage to return, around ten thousand years would have passed. Sabrina would therefore have made a journey of ten thousand years into the future. “The universe is full of magical things patiently waiting for our wits to grow sharper,” she liked to quote, from the author Eden Phillpotts.

((pp 261-267))

8.

There was enough space for all of them in the SUV. Sabrina drove like a rabid dog. Ever deeper into the Mojave desert, thundering twenty miles down Highway 50, the loneliest highway in America, before taking a turning. Then ten miles over a potholed track. Behind them Las Vegas still glimmered; ahead of them there already shone the buildings of the CON. They really hadn’t cut any corners: a new, albeit considerably smaller, CERN had arisen here. Sabrina had to go through two checkpoints before she parked the car and her guests followed her into the main building.

Into the heart of the light.

(For now, at least.)

Into the control centre.

Inside, you were blinded by the countless monitors and blinking instruments. On the screens in the LINLC control centre, Sabrina showed Omega the workings of the linear (LIN) accelerator (Lepton Collider), this one an electron-positron accelerator, the machine in which particles were sped up, but still only to near light-speed.

“Do you see this, Omega?” asked Sabrina, pointing at the monitor.

“What?”

“The particles.”

Omega screwed up her eyes.

“They're whizzing pretty quickly,” she said, “but if I concentrate, I can see them before they collide. And then it's like there's a kind of rain.”

“Incredible,” said Sabrina. “If you could make the particles even just a little bit faster, we can’t manage it, then there’s a very high probability that we'd succeed in what we're trying to do.”

“And what's that?” asked Gusto.

“Sneutrinos, Squarks, Higgs-”

“Bless you,” said Omega.

“Higgsinos,” said Sabrina. “You know Einstein's famous $E=mc^2$. That of course also means $m=E:c^2$.”

“Sorry?”

“E stands for energy, c for the speed of light and m for mass. The faster something moves, the more energy it has. The more energy it has, the greater its mass becomes. But the greater the mass, the harder it gets to accelerate the particles. Truly a vicious circle. We don't have any solutions.”

“What?”

“Don't you see? Take a muon. A muon that's moving at 99.9% of the speed of light has 22 times as much mass as a resting muon. If you increase the speed to 99.999% of c, the moving muon is 224 times as heavy as the resting one. But if the speed is at 99.99999999% of c, the muon's mass is 70,000 times as big. The closer we get to light-speed, c, the heavier the particles become and the harder it is for us to accelerate them. We can't bring any particles up to light-speed. But we'll have to if we're going to discover any of the even smaller particles."

"Uh-huh."

"We're searching for the partner particles," said Sabrina, "the superparticles among the elementary ones. Superneutrinos, superquarks, super-Higgs-particles, we want to prove superstring theory because we're on the path to a global formula, a unified field theory. Our research will yield results that will finally tell us exactly how the world came to be. It would go quicker if we had an accelerator the size of the Milky Way. Nursov even says: the size of the universe. But, well, we don't. So if you could please use your skills."

"And what am I supposed to do?" asked Omega.

"You see, the amount of energy we need to observe matter of the same order of magnitude as a Planck length is only around 1000 kilowatt hours. That's not the problem. The difficulty is in concentrating that energy on a single particle, on a string. That's what we can't do. And that's where you come into it."

"Which means?"

"You make the particles move faster! As fast as possible!"

"Which means?"

Gusto exclaimed: "You give the little blighters a kick up the arse!"

"You could put it like that," said Sabrina.

"If that's all," said Omega, "then let's get on with it."

But now – that is, either just before Omega gave the particles a "kick up the arse" or just after she had done so or while she was doing it (this singularly crucial detail is, unfortunately, beyond my ken) – her brother made his first big entrance. Alpha Ferdinand Zacharias. He called Sabrina out. The tablet computer had long since disappeared into his backpack. And now he revealed himself to be someone who was fully aware of what was going on around him.

"Why?" asked Alpha.

"Excuse me?" asked Sabrina.

“Why do you want to know that?”

“What do you mean?”

“How the world came to be.”

“Why not?” she asked in response. “Everyone wants to know that.”

“I don't,” said Alpha. “I couldn't care less.”

Nor could I, old Gusto would have cried if he hadn't been afraid of hurting Sabrina. So he held himself back.

“But,” said Sabrina, as she noticed that Alpha would need a bit of talking round, “it must interest you to know whether there are parallel universes. Whether it's possible to travel into these parallel universes. The first step would, for example, be for CERN or CON to have more time (I'm talking about billionths of a second here, Alpha, when I say more time), that is, to have ever so slightly longer to observe what are called micro black holes.”

“Black holes? I thought they eat everything that comes near them. Isn't that dangerous?”

“Oh, tosh,” said Sabrina, remembering an old word she hadn't known was still in her vocabulary.

“One of these black holes, couldn't it get bigger?” asked Alpha. “I heard it would grow and grow and swallow everything nearby, unstoppably, until in the end it swallowed the whole world.”

“Hawking's theory states that black holes give off energy at their edges. That means micro black holes decompose shortly after they're created. CERN and CON have already made several of these holes. All of them decomposed immediately. Hawking's theory has been more than substantiated. What's important now is to observe them for a little longer, the holes I mean. For that, they need be only very slightly bigger.”

“Hawking's theory?”

“Yes.”

“And what if it's not right?”

“The theory, I said, has been substantiated.”

“Substantiated? Not proved?”

“We can safely assume that the theory's correct. To talk about proof is difficult insofar as ...”

“So you're saying that because of a theory that hasn't been proved, you want to create a black hole that, if this unproved theory turns out to be wrong, could mean the Earth and all its masses, muck and merchandise get completely swallowed up?”

“You,” said Sabrina, “have a totally false understanding of the nature of a scientific theory.”

“So,” said Alpha, unveiling for the first time his talent for visual examples, “that's like if I stuck my head between a crocodile's jaws at twelve noon just because I believed in the unproved, so far only substantiated, theory that the crocodile's lockjaw lasts every day from twelve till one.”

“Eh,” said Sabrina. “What?”

“And if the croc happens to bite down, I would say, if I still could: My theory has proved to be false.”

Sabina said nothing.

Alpha clapped his hands, as if to wake those present from some hypnosis. “Enough now!” he said. And turned to Omega. “Come on, we're leaving!”

Omega: “Do you really think so, Alpha?”

“You don't do something like this just because. We should think about it first. About the consequences and so on, do you see what I mean?”

“But I've got the feeling now that I could …”

“Please! Omega! This is all so vague. Think of nuclear power plants. Strictly speaking, the reactors should only have been built once they'd sorted out the problem of radioactive waste. So, strictly speaking: they still shouldn't have been built yet. Without even mentioning their safety record. Do you understand? We can't always act like the problems we create for ourselves will just go away somehow. That's our society for you: act first, think later. In my opinion, it would be a very good idea if this time we thought first instead of acting." And said nothing more. Tramped resolutely away. In the certainty that his sister would follow.

"Sorry," said Omega. "But maybe he's right. It's never done any harm, has it?"

"What?"

"Thinking before you do something."

"But …" said Sabrina.

"Pushed back doesn't mean called off. Let's see, Sabrina. Maybe it'll still work out."

With that, Omega went after her brother. Towards the exit. As did Escher. Gusto shrugged his shoulders, used his thumb and pinkie to make a telephone symbol to Sabrina, and hurried after his grandchildren and their hollow dog.

Disappointed, Sabrina was left to her own devices. Literally. That is, to the devices of the CON. Via its control screen. And in that moment, the intensity of the much-loved proton beam radically dropped. Sabrina thought she heard a noise, which shouldn't actually have been possible, but she did: it sounded like it does when a grain of corn pops in the pan. Unknown effects whooshed past on the monitor. (You have to realise that they never observed the particles themselves, but only ever the effects that spread after an achieved collision, like a peacock's fan.) And this here was strange. And that was marvellous. Because what she saw, without knowing it, though she certainly suspected, were the unfamiliar effects of a man-made micro black hole staying put.

And not decomposing.

Higgs.

I have spoken.

Schöffling & Co.
Foreign Rights
Kaiserstrasse 79
60329 Frankfurt am Main
Germany

phone: +49 69 92 07 87 16
fax: +49 69 92 07 87 20

www.schoeffling.de/content/foreignrights/news-start.html