



Chapter VII - 2

For ages and ages, the most ancient civilizations have developed unprecedented abilities in crafting knowledge and artifacts. Then, after an unspeakable amount of time, the human civilization appeared on Earth. Not on the firm ground did the ancient forefathers step, not as firm as their ancestors' illusion, but on the swaying branches of the tallest trees. There, life had already manifested the perfection of its ingenuity. As atoms combine to form proteins, carbohydrates, lipids and nucleic acids, human beings have come together to stack their own bricks of life. In this fractal geometry, with no beginning and no end, they have raised houses, bridges, temples, with a unifying goal for all the species: to survive. Yet, beyond their goal, deeper down in this fractal hierarchy, their actual drive was only that of their own bricks. No one has ever grasped where this chain ends, if ever. Small objects driven by tiny entities, in turn jolted by infinitesimal concepts, in a never-ending flight that only imagination can explore. Human beings call this emergent phenomenon in many ways, loosely referred to as science. For them, everything in this boundless universe abides by their own laws, which they have forged, with great care, from their negligible viewpoint. Here is where another marvel unravels: the apparent drive of their pointless life is breaking down their own laws. Formidable architectures to bend the mighty nature, flying vehicles to defeat gravity, powerful drugs to counteract death. Everything, to challenge the laws of reality that bound them here. The ancients have long known this deep truth: the only one way to affirm something is by negating what it is not.

“That’s it, that’s it!” – shouts Ujana, unrestrained.

“Really, are you sure? Is that the lighthouse?”

“Yes, yes, of course, I remember it! I thought we were a bit closer but it’s that one for sure. I remember the hills, the shape of the bay and other things...”

“Then that’s great, everything is going perfectly!” – you exclaim – “We’ll be there in less than an hour or so, and someone will be waiting for us there!”

“I hope so. I hope my parents are fine, and that they will not be too angry. I’m so sorry for this situation and I don’t know what to tell them when we meet.”

“Nothing, there’s nothing special you should say. Look” – you point at the distant bay with the tower – “both there and at home, they’re waiting for you, they’re worried about you... Having you back will make everyone so happy. Seriously, it’s a miracle that we met and you’re fine, don’t you understand?”

“Yes, I do” – says the boy, with some hesitation – “but I’m so sorry for what I’ve done, they will never forget it.”

“Please. Do you remember the lights we saw on the hills? Remember how many there were? Lots of people are searching the woods at night to find you. Your dad is probably leading them, and all you can think of is if they’ll tell you off?

“...”

“They just want you back, so your only goal is to find them now. Doesn’t matter if we meet at the bridge or at the lighthouse, we need to get to them. I’m gonna be very upset if you don’t stop being so hesitant, ok?” – you emphasize, to draw his attention and keep him focused.

“All right, got it. We’re already walking fast though, what else can we do?”

“Nothing, just think about tomorrow, when we’re home and everything is behind us... In the meantime, why don’t you tell me more about your... About you, if you want.”

“My family... sure, I can tell you more about them. I told you about my mom...” – he mumbles, showing some latent concerns.

“Yes, you said many beautiful things about her” – you smile, to nurture the enthusiasm – “so you can tell me something more about your place, your hobbies, your friends, your typical summer day: whatever you like!”

“I could tell you about my relatives, but there is another problem with them... and it’s all because of this situation.”

“What’s wrong now?”

“It’s because of all those people that are coming to save me. This situation makes things more difficult to everyone, especially to my parents. You remember that my mom was nervous and sad, but she didn’t want to talk about it?”

“...” – you nod, ensuring you are listening carefully.

“Well, in the last few weeks we received visits from people from the town. Sometimes family friends, sometimes random people, sometimes people I’d never seen before who brought papers and bags of stuff... Sometimes they expected these visits, sometimes they just showed up and I saw them talking a lot and, after, they are always lost in thoughts.”

“And why does this make you worry? It’s normal that people receive visits, especially adults, isn’t it? Maybe they are planning to move and they haven’t told you yet, or they have some paper work to take care of?”

“Really, can’t you see why? They’re all coming to save me, which means my dad had to ask these people for their help to come find me in the middle of the night, even if they were upset.”

“Why are you so sure they were upset? I don’t think they were, you know. And even if they were, does it really compare to a child going missing?”

“Maybe no... but if you’d seen them, you would understand. Couldn’t hear what they were saying but sometimes I saw them arguing from the window and it was sad. And now these people have to cross the woods at night to save their stupid son.”

“I see but look, they’re not strangers: they know you and your family, even if you don’t. For sure they never even hesitated.”

“...”

“You have no idea what it’s like to fear for a child’s safety. So, whatever the issue was between them, it has nothing to do with

you. Helping your family bring you home takes priority over any other matter.”

“...”

“U, do you understand that you can’t compare this situation to any other possible argument they might have?”

“Maybe... but I’ll believe it if you say so.”

“Good... The only thing that’s important now is returning home... so you need to do your best to go back to them.”

With these words, you silently proceed along the seashore, on a clear path illuminated by the moonlight. You feel you left your mark on the child, who seems positively shaken by your words: evidently he was more shocked than he gave to see, which urges you to choose words carefully to keep him motivated. At least, the situation was clearer now and everything started making sense; yet, it was impressive how reality can be, at the same time, crystal clear for adults and obscure for a child. The unfortunate condition of a family of farmers, having to cope with the uncharitable pressure of a capitalistic society, without letting their son feel the struggle. They must be great people, you feel, to grow such a bright child in these conditions. Only one piece of the puzzle hadn’t found its place yet, but that was not difficult to solve.

“U... I was wondering: have you ever heard your parents talk with people about the book?” – you ask, kindly and naively.

“This book? Let me think” – he mumbles – “Oh... actually yes, a couple of weeks ago. Well, I only saw him, my dad, showing it to three people I had never seen before. Pretty scary, actually. They were dressed in uniform, tall and grumpy. That was the last time I saw the book until yesterday... why?”

“Nothing, just curious, no particular reason. Look! Have you noticed how large the moon seems from here?”

The two of you continued to walk along the seashore charmed by the moon, whose gorgeous reflections were shining as luxurious tendrils of handcrafted gold.

“Who knows what happened with the book.” Certainly, the story told by Ujana sounds real: it comes as no surprise that it played a role in the hands of a family of farmers. What is interesting, in this sad and unusual circumstance, is why his father owned that jewel, and why those officers were interested in it. For instance, someone in his family could have found it and someone else claimed it back. Indeed, it is not rare for farmers to uncover small treasures or tombs while plowing the soil: you personally heard of secondhand stories, similar to this one, in your native land. Another possibility is that, maybe, it could be a rich gift bequeathed by a wealthy relative. “This looks reasonable but, still, why would they show it to the officers? Also, why carry it around during a summer day, and why Ujana would not know its origin?” Everything suggests that this book just appeared in their life, in a somehow bigger way than a child can grasp. However, perhaps you are running too much with your imagination and there is a much simpler explanation for this story. After all, you just don’t have enough elements to explain it, especially from the memories of a child... but, you know, you like speculating.

While lost in your thoughts, you have walked for quite some time with a good pace, in the company of soft waves and bushes oscillating under the wind. The visibility in front of you is limited, due to the curving shape of the seaboard in that area. Only every now and then, the tower reemerges from the distant landscape.

“Can I ask you a question?” – says Ujana, bringing you back to reality – “It’s about that story, with my dad and those people.”

“Sure, don’t be afraid!”

“I’m not afraid, only... confused. It was one of those days, when he showed it to those people... anyway, one evening my mom came to me and said something that I didn’t understand.”

“What?”

“She came to me with a strange look, while my dad was having dinner, and she made a long and confusing argument, absolutely without rhyme or reason. Then in the end she said:

‘... so, my boy, if one day someone tells you something strange about our family, don’t listen to them. Ever. People sometimes are envious of what they don’t have or cannot understand. But you know the truth, and no one will take it away.’

Then, she smiled, hugged me and went off to another room.”

“I see... and what did you think or say in that moment?”

“Nothing. I said nothing, just nodded and smiled to make her happy. But now I can ask *you* what she meant. Do you have any idea?”

“Me? No, no idea, sorry” – a sad expression arises on his face – “I mean, I cannot know what she meant exactly, since I didn’t hear the first part... but it’s not unusual advice to give to children.”

“Why to children? Did she say that because I am a child?”

“No, of course not! But adults have usually learned this lesson... that’s why it’s more common to emphasize it to children. See what I mean?”

“Hmm, I see... I think so.”

“Probably she was thinking about your classmates or people in school. You know, how they could make fun of you for some reason and tell you nasty things. Could it be that?”

“Maybe. They do make fun of me sometimes but I never listen to them. I just ignore them and they eventually stop.”

“Nice, that’s a good reaction! Better to leave them be and go your own way.”

“Yes, I think so too. I’m not sure it’s always the best but, yeah, that’s what I do.”

“Why not? You are doing the right thing, being patient and brushing off what they say.”

“Well, if they’re right it’s even worse if I don’t listen to them.”

His comment blindsides you and leaves you stumbling for a few seconds. You raise your eyes to the clouds, as if they could inspire how to reply. The last thing you wanted, now, was to instill doubt in him, already worn out by the situation.

“Well, I think that one should listen without being affected by emotions and, then, decide freely. I’m sure you did very well.”

“You mean... I should listen to people and learn from their advice, but ignore them when they say something bad?”

“In a sense, yes.”

“So what if someone says something bad but they’re actually right? What if they try to convince me of something I consider crazy? I can’t just ignore them because I don’t like it.”

“Fair enough. Nothing is only right or only wrong though: the truth is always somewhere in the middle and the challenge is to spot it. Actually, the problem isn’t really *what* they say but *how*. Maybe this is what she wanted to tell you” – you venture.

“I’m not sure. This is more similar to some advice my teacher gave me. I think my mom was talking about last weeks’ events, as if someone could come up to me and say something bad.”

“I don’t know either” – you murmur – “I should have listened to the whole conversation.”

“Yeah, shame you weren’t there.”

“What if you ask her again, when you meet her?”

“To my mother?” – he asks – “It’s not easy, I’m not sure I can find a way... I wish I could.”

“Why not, I believe she’d be happy to explain it again” – you reply with a sincere smile – “By the way, what’s the advice your teacher gave you?”

“My teacher? Actually, she always tells me so many things... She teaches philosophy and natural sciences and she’s one of my favorites - not only for her subjects but because she’s very caring with everyone, especially with me.”

“Did she warn you recently too, like your mother did?” – you dare to ask, carefully.

“No, nothing specific like that. She just usually tells me not to trust people easily, especially when it comes to science.”

“Did she really tell you not to trust people?”

“Somehow yes, why?”

“That is... bad.”

“Well, maybe that is not exactly what she said, I only tried to summarize it. She’d say something like:

‘Don’t always trust people who explain things with miracles, superstition etc. You know that there are laws of nature, and everything abides by them. That is one of the reasons why you all should study science in the first place: science opens your eyes and provides you with a tool to find the truth.’

“Wow, so that is your ‘I kinda remember?’” – you wonder – “Imagine if you remembered it perfectly... It sounded as if you were reading it!”

“Hehe, she said that so many times actually! The last time was just three weeks ago, that’s why I remember it so well.”

“I see... anyway, that sounds different from a generic ‘don’t trust people’, which is quite bad advice. What’s your take on it?”

“Well...” – he replies, turning his look to the sky – “I think life is hard, people are complicated, decisions can be random... but there are a few things that you can always trust, like science, because they’re always right and illuminate the path, as she says.”

“Hmm, anything else?”

“Let’s see... That we should not trust people when they explain things using superstition or religion, because they are unsupported or... simply, false. That we should study science because it shows the truth, and we can use it to make something good for us and for the world.”

“Do you believe in it?” – you ask, smiling softly.

“Of course! You know that I like philosophy and geometry, and she says that everything comes from these rules. Well, you also told me the same! So of course I believe her, and I want to learn the truth. I think that, somehow, my mom feels the same.”

“Would you like to talk more about it?” – you smile again, to put him at ease.

“Yes, I’d love to! Soon we will be at the lighthouse so I want to listen as much as possible! Can you tell me more, please?”

“Sure. Actually, I’ll tell you something that connects to what your teacher and your mother told you. So that maybe you can think about it in the future... how does it sound?”

“Sounds cool, please!”

“Great, so... what if told you that science isn’t always right?”

“Well... that it’s a joke! I know you like science, and you are super good at it! All those stories with optical illusions... so cool!”

“No, U” – you reply with a stone face – “I’m serious: science is not always right.”

0

A heavy curtain of silence falls over the shore, as you enter the shady coast towards the tower. The atmosphere becomes tense, although for you nothing special had really happened. Next to you, instead, the child becomes visibly stiff and keeps walking without moving his stick. In a sense, he seems to be studying you, weighing your voice to catch a trace of sarcasm. Apparently he fails to find it, as he breaks the silence with a timid question.

“Are you serious or was it just a joke?”

“I’m being serious, surprised?” – you ask rhetorically.

“We’ve been talking about science the whole time... You were so enthusiastic, and now... now you tell me that it’s not correct?”

“But I never said it is not correct, did I?”

“You said that science is not always right, it’s the same.”

“Oh no, there’s a big difference instead.”

“Hmm, no...”

“Never mind, that’s exactly what we’re talking about. Let’s do it this way: I tell you my opinion, you tell me what you think about it and then we talk about your mother and teacher again. How’s that sound?”

“Sounds... OK?” – replies the boy, reluctantly.

“Great. So...” – you begin – “I believe that science is not right simply because it is not a perfect description of reality.”

“...”

“Nature is complex - too complex - so what brilliant people did was to model it... to describe it using simple rules. Today we call these rules theorems or formulas, and we find them in every textbook like yours.”

“So... why do you say that it’s not right?” – he asks frowning – “Nature can be complicated but when scientists find these rules they are true and explain reality. Just like with illusions, right?”

“Oh well” – you reply smiling – “I think there’s a lot more to it than we discussed. Anyway, since we still have some time to kill... do you feel ready to explore it more?”

“Yes... I guess?”

“All right. Then maybe we could talk about what we mean when we say model. I’m not sure they teach that at school, did...?”

“No, we didn’t cover it.”

“OK, so here’s a very simple explanation!”

“...”

“Basically, a model is a simplified description of reality, which is good enough to make useful predictions in a given situation. A model can be inspired by some phenomena in nature, or can be something abstract: what is important is that it’s just a scheme created by people to describe the world.”

“I don’t see how this is related to what my mom said, and why we’re talking about schemes. Scientists work with formulas and theorems, not with schemes.”

“OK OK, maybe that was bit too abstract, sorry.” – you murmur – “Let’s go back to our optical illusions, shall we?”

“Ah, you know I like them!”

“Yeah, I know. So, do you remember when we described light as something that is both a wave and a particle at the same time?”

“Hmm, I’m not sure... You asked me if I know that light is both a wave and a particle, but then you changed topic and made it simpler, you said.”

“Yes, that’s true, you’re right. So, we can describe light in two ways: sometimes it’s easier to see it as a wave, sometimes it’s better to see it as a particle. Light, out there, is actually always the same” – you continue – “and, of course, we do not change reality: we only change the way we describe it using our language. Do you see what I mean?”

“I don’t know. If light is still the same, and it is one thing, why can we describe it in two different ways? It is non-sense.”

“Because in the end both descriptions should lead to the same conclusions, so that everything works and is consistent.”

“OK, I see... but if one description was enough to describe reality, why people invented a second?” – he asks naively – “Is it to check that the first one was correct?”

“Well, for light that happened for historical reasons which are not important now. What matters for us” – you emphasize, slowing down the conversation – “is simply that we can create different models to describe reality (for instance, light as a particle or as a wave) but reality is still the same.”

“Hmm, maybe I understand but... wait...” – he stops and looks at you confused – “what if people create two models and, one day, they predict two different results? I mean, can two models disagree when they describe the same thing?”

“Well, let me...”

“See?” – he grumbles – “now I’m confused again.”

“No no, that’s a very good point actually! You’re right: sometimes, models can make predictions that are incompatible. When this happens, well... it’s quite a big issue for scientists.”

“And what happens?”

“Scientists try to invent and perform clever experiments to test which is the best between those models. Then, they look at the result to see which model made the best prediction. From that point on, the other model is usually abandoned.”

“And what if both models fail to describe the experiment? Can this happen?” – he asks, fully engaged by the conversation.

“Yes, that can happen as well, but it’s much rarer. And when it happens it means there’s a lot more that we have to understand about nature, and scientists will gather and discuss how to build a third model that explains this new observation. Plus, of course, everything else the first two models already explained.”

“I see...” – mumbles Ujana, before a long pause in silence – “but if this is true, does this process ever end? Is there a model that is perfect and cannot be surpassed?”

“That’s exactly the point! Science is a never-ending process where theories (models) are developed by the most brilliant minds, then tested, and finally accepted as best candidates to

describe reality... until a new model is proposed to improve it. So, in the end, this process never stops. Do you see the beauty and the power of this approach?"

"Actually" – he timidly replies – "to me it seems it is only more fragile..."

"What! How can it be more fragile! This flexibility is the very essence of its power! It's called... oh, it doesn't matter, just take it as one of the main principles of science."

"OK... so, why am I studying all these things if one day they will be improved?"

"Hehe, because it's very unlikely to find better descriptions for the things you're studying at school at your age. They are basic, so well-established and proven that... you see what I mean?" – you ask with confidence – "You won't see a theory that can be improved until later in your studies. Probably at university."

"Hmm... what is a university?"

"The university come on! Don't you have one around here?"

"Don't know, never heard about it. Is it a type of school?"

"A school?" – you laugh – "OK, let's say it's a very, very big school. It's where some teenagers go after they finish high school. They teach you very advanced topics, you can choose a subject that you want to study and focus only on that one. Cool, isn't it? I'm sure you will like it!"

"Don't they come back home for lunch after school?"

"Lunch? Why lunch?"

"They go there after school, you said."

"Oh no, come on! I mean, after compulsory schooling, when students turn 16 and become mature: someone will find a job, some will continue to study for a few more years at university."

"'A few more years', seriously? How many more years should I study then?"

"Yep, that's how it works but no worry: when you get there, everything will be fine, trust me. By the way, I'm surprised you never heard about it!"

"..."

"Anyway, is it clearer now?"

“Maybe... but I don’t see the connection with my mom and my teacher. I feel like before I had certainties, and now everything seems so... fragile? Even science is not a certainty... Plus, I can’t see the tower anymore from here.”

“I am sorry it confused you but the idea is actually very, very simple. Let’s put it this way: you can never prove that something is true, you can only try to show that it’s false.”

“OK, fine... so?”

“So, when your teacher says ‘science opens the eyes and shows you how to find the truth’, you should not think that science possesses this truth, because it does not... Instead, that knowledge, together with the cautious approach we described, will always help you whatever you do in life.”

You feel proud for the good explanation you improvised. Who knows how many years have passed since the last time you talked about it... but, apparently, it was well rooted in your mind. Also, despite the unfortunate circumstance, it was cool talking about it with a child, who had no preconceptions whatsoever.

“So, about your mother, maybe we can underst...”

“Oh, it’s fine thanks. Now I see what she wanted to tell me.”

“Really? That’s great, I’m happy you made it. Do you want to share it with me?”

“There is not much more to say. ‘I can never prove that something is true: I can only try to show that it’s false.’ I think she didn’t mean anything more than this.”

