

Stories

The Two-Dimensional Apple, The Three-Dimensional Apple, and the Four-Dimensional Apple

There was once an apple that wished to live in four dimensions. It was a sound, solid three-dimensional apple, but it was unsatisfied. The three-dimensional apple went searching for a teacher, a guru that could teach it to live in four dimensions. At last it found an apple that was four-dimensional, and asked it "please, teach me what it is like to live with another dimension."

The four-dimensional apple replied, "you must first go and find a two-dimensional apple. It will ask you the same question, and when you have answered its question, return to me." So the three-dimensional apple set off.

Now it happened that there was a drawing of an apple, and the apple that lived in the drawing mourned that it was flat and could never know more than the two dimensions of the page on which it was drawn. Then one day the two-dimensional apple met a real apple, a round, red fully ripe three-dimensional apple, the very same that had sought to know itself in four dimensions.

"Teach me what three dimensions are like," the two-dimensional apple begged.

"I can't do that," replied the three-dimensional apple, "it would be impossible for you to experience three dimensions in the plane of your two-dimensional page."

But the two dimensional apple went on pleading, and at last the three-dimensional apple hit on an idea that might help. "The best I can do," said the three-dimensional apple, "would be to show it to you a slice at time."

And so the three-dimensional apple passed through the two-dimensional apple's page, revealing to the two-dimensional apple the three dimensions of its being in a series of plane sections cut through it, each one thin as a page but in sequence all together summing up to the full round red apple.

The two-dimensional apple thanked the three-dimensional apple and let it go on its way, completely satisfied. The three-dimensional apple returned to the four-dimensional apple and said "I have done what you asked and I am ready now to know four dimensions. I want to know myself complete in spacetime, not only perfect, round and red in space, but also in all the moments of my being, from the time I was a blossom on the tree until the moment I will be picked, eaten, and gone."

And just as the three-dimensional apple had been forced to tell the two-dimensional apple that it could not be done, so the four-dimensional apple now said sympathetically "there is no way for me to reveal to you four dimensions within the confines of three – you would not be able to grasp it all within the space in which you live."

"But," went on the four-dimensional apple (just as the three-dimensional apple had said to the two-dimensional apple before), "though you cannot exist four-dimensionally in all moments of time within your three-dimensional world, I can show it to you a moment at a time."

And so the four-dimensional apple passed through the three-dimensional apple's world, revealing time to it from moment to moment, just as the three-dimensional apple had shown itself to the two-dimensional apple a slice at a time. And the three dimensional apple came to know its own timeshape, learning it in the unfolding,

aware of all the moments of its being in sequence, one after another – just as we do.

The Actual Contents of Pandora's Box

The original story was written by someone sour on the world, a senex, a suicide or an old woman incanting troubles to the 10th generation. I will tell you the true story.

You must begin by imagining a box. It may have many sides, or if you wish you may imagine it having only four (so most say, conventionally). It may have hidden compartments (even if you don't imagine them, they will be there, imagining you – imagining you into existence the moment your hand unexpectedly opens the lid).

Inside is – the unknown. The shape of the box is a decision. Inside the decision, an entire life lies folded. It will unpack itself from your decision. You can't know.

So much energy spent trying to prognosticate. The weather forecast never includes earthquakes, volcanoes, or what you might do tomorrow. Nor can it accurately foretell the sun-warmed moment of utter relaxation that drops you into a field of gratitude, some ineffable insect's hum becoming your peace.

Generally, what the box holds is a major life decision, but one that doesn't come clear until retold generations later, unrecognized until the grandchildren, themselves grandparents by now, tell the story.

(All such things come wrapped in tiny packages that look like nothing larger than the choice of what to have for lunch; yes, we've heard already – a butterfly flutters its wings in the Orient and before you know it New Orleans is swamped.)

In Pandora's Box are selves unrecognizable, a life you could not have imagined. How did you think you could? Your poor linear

thinking, a few tentative visions, barely stretched from the fabric you are – that won't do! Inside Pandora's Box are fabrics you never dared to wear. Bright satiny blues, orange sashes! Too bad they sometimes wind up used only to be your burying cloth.

Ah, death. That's where the story takes hold – the unknown is not fully unknown until the moment of death. The unknown is always a death and a rebirth. Horrifying, if you are a little attached to you.

Housecleaning is one thing, this wholesale remodel quite another. Walls knocked out, rooms redivided, made more spacious, growing with their own logic, like a cancer. Would you really have wanted to move if you'd known? Would you have taken that drive? Walked across that parking lot? Oh, if only I'd known! (It lay packed inside Pandora's Box.)

We were both just 19 when she said to me "The dew on the rhododendrons this morning is unlike the dew on any other morning," unaware that she was for me that moment that dew. And then we both withdrew from that dazzling intimacy of ordinary reality and went another way, never coming close again to that life's journey that just for that moment lay open beneath our feet.

In this world each moment is unique and Pandora's Box opens only once for each of them. Once it closes, when next it opens an entirely new moment lies breathing within, a different life.

The Physicist and the Thinking Machine

Once there was a physicist who owned a wonderful thinking machine, with which he was able to plumb the most hidden reaches of the obscure and the wonderful. With it he achieved great fame and soon became the most trusted advisor to the king. However, it is in the nature of all machines

to fail and as all do, this one lived out its useful life, and began to show signs of its age in the insensible answers it delivered. Worse, as is the way of it with machines, it broke down only when it was most needed.

It happened that a question affecting the freedom of the entire kingdom arose, a question that required the physicist to find a way through the tiniest doorway that lay at the heart of matter. Yes just then the machine began seeing double.

There appeared, the machine said, to be two doors, not one, and behind each door lay an alternative answer to the question the physicist asked. But most oddly of all, the machine told the physicist that the answers behind each of the doors were given before the question was asked.

This was unacceptable! – reason enough to junk the machine if it could not be repaired. But repairing such a machine is a thing more easily said than done, and as for getting a new one – well, just try! No such machines were to be had for ages past, and God alone knew when another might become available.

So the physicist strapped the machine to his back and set out in search of a mechanic who might be able to repair it. As he stumbled along, carrying the (it must be confessed) scarcely portable thinking machine, he chanced upon an old man whose right eye squinted in what seemed to be a permanent wink, sitting on a stump by the side of the road, smoking a pipe and thinking of nothing at all.

The sight of a man so idle and unengaged in any sort of useful activity might have irritated our dedicated physicist in the best of times, but now, struggling along and sweating under his load, he could scarcely bring himself to make a civil reply to the old man's greeting. He did grunt a grudging acknowledgement however, and was just

about to pass ponderously by when to his surprise the old man impertinently inquired why he bothered carting that old machine about?

Snorting with effort – whether of dropping his load (which he did, right there in the middle of the road, being at the end of both his endurance and his patience), or of bringing himself to reply to so preposterous a question, the physicist sat heavily down next to the old man, a bit light-headed with his relief from the awful weight, and found himself blurting out the entire thing – the marvel of the wonderful thinking machine, how he'd come to rely upon it and how it had advanced to him to the very first rank of the king's advisors, and now how it had begun to spit out paradoxes that could hardly be believed.

"Well," said the old man, tapping his pipe on the stump, "if that's all it is, I will gladly take it off your hands for you – I deal in scrap metal you know; it might be worth a few cents."

"But then," cried the physicist, despairing, "how will I get the answers I need?"

"What!" said the old man, "are they so important?"

"Critical!" shouted the physicist. "You see, without the answers to our questions it will be unknown whether freedom exists in the kingdom, or whether we must all become slaves to obdurate necessity!"

"Oh in that case we'd better see what we can do to relieve you of them as well" said the old man. "What is it that you are trying to find out?"

So the physicist explained that an archer had come to the kingdom, a man named Zenon, who had proved that nothing at all could be done. The next thing anyone knew, a boy running to catch up to his

friend found that each moment he reached the place where his friend had been the moment before, only to find that in that same moment his friend had moved on. And when the boy ran doggedly on to where his friend was now, well, again his friend had moved on. The kingdom was just then holding its Olympiad, and the races went on interminably. The winner could never be judged, leaving the king sitting forever in the reviewing stand, unable to get on with the business of ruling the kingdom because he was unable to bestow the laurel on the smiling head of any winner. And when the archery contest was held, this same Zeno shot an arrow that rested eternally in each moment of its flight, so that it never moved at all!

The people and the king had all flocked to the physicist, asking him to use his wonderful thinking machine to rid them of these problems. Not only were they greatly annoying to the practical chores of everyday life, but they were deeply unsettling and they all would rather not think about them. ("That's the ticket!" the old man exclaimed, but the physicist did not pause.)

The physicist explained how he had fed these problems into his wonderful thinking machine, and how it had led him through one door after the other, each one, like Alice, growing smaller and smaller until he came to the smallest, tiniest door of all at the very heart of matter, and how there the machine had begun to see double and how it claimed that the answers that lay behind the doors were decided before the question was given.

"Oh, well if that's all" said the old man again.

"What!" cried the physicist in a rage of frustration.

"It's nothing different than what you do every day, constructing yourself from

moment to moment," said the old man.

"I don't understand," said the physicist feeling lost in a great wood.

"Now you've known since Einstein" said the old man, "that space and time are not two?"

"Yes" said the physicist.

"And you know that there is no such thing as empty space or unfilled time?" asked the old man, "but that wherever matter exists, time and space appear around it?"

"Of course" said the physicist.

"So all of time (and necessarily all of space, if they are one field) exist at once?"

"So it is said."

"So spacetime is always already there, wherever you go, whatever you think?"

"That's what the thinking machine says."

"And what would you call that, then?"

"I don't want to think about it."

"Good – you couldn't anyway, and that's how you've broken your thinking machine. But tell me this, doesn't your thinking machine also claim that there exist parallel universes, and that at every moment uncountable choices are made, not only by human beings, but throughout all existence, and that with every choice, a new universe splits off created by that choice, so that all conceivable possibilities come to be and are lived out simultaneously?"

The physicist was astonished because this was precisely what the thinking machine had said the first time it frightened him with an absurd answer, and he had gone to

some lengths to hide it, never telling anyone.

"Yes," admitted the physicist miserably, "it did give me that answer once and I tried to conceal it from the king. That's when I should have faced up to the fact that my thinking machine was breaking down, making no sense at all. I should never have let the maintenance of it get so far out of hand."

"Not at all," said the old man, "your thinking machine has given you the best answer it can. But recall what we said a moment ago, that all time and space are created by matter."

"Yes, what of it?"

"Well, then, it is the same with thought" said the old man.

"Now I am lost and will never find myself again" cried the physicist.

"Don't be dramatic" said the old man, "you were never here in the first place, not in the way you think, so how could you be lost? But what does this tell us – if all time (and necessarily all space are here at once?"

"If that were true, they would be illusory" answered the physicist, trying to calm himself but feeling more and more seasick.

"Indeed," said the old man.

"But then we would have to abandon time and space" exclaimed the agitated physicist – "it can't be done!"

"Well, you can't think without them," agreed the old man. "But they are only categories of thought, artifacts of the way you think – the way you must think, to think at all. That does not make them *real*."

"Then tell me," said the physicist "how this helps me with my problem."

"Oh *that*," said the old man, "I thought we'd already answered *that*."

"*What? How? No!*"

The old man sighed. "You are disturbed," he said, "because the answer seems to be given in advance of the question. You are frightened; all those in the kingdom are frightened. If all exists already and at once, you fear because you wonder how you may have the freedom to be yourself, to make your own decisions and to define in your own unique lives who you are."

"That is true" said the physicist.

"Think of it this way," said the old man, "the forest that surrounds your kingdom – it is old, primeval, and has never been penetrated."

"Yes" said the physicist.

"Does it exist?" asked the old man?

"Certainly, I think so."

"And do you walk in it?"

"Yes, what of it?"

"And do all possible pathways through the forest already exist?"

"I suppose, in a manner of speaking, they do."

"And are you free to choose your path when you walk, sometimes not even knowing where you are going, but just rambling at will?"

"Yes, I do that," said the physicist beginning to feel excited.

"So that, if all pathways are already given, is not the answer to your choice, already given not only before you make your choice, but even before it occurs to you?"

"Oh," said the physicist, "well."

"But if you thought that the forest had to be created around *your* choice, if you thought that the time and space of its existence could only come into being wherever *you* traveled, by the act of your traveling through it, if you thought it were all to be given only after the question of *your* pathway occurred to *you* and the decision as to *your* next step was taken by *you* – how hard would you find it to make sense of it all when you found not only that the paths you want to take are already there, but that the entire forest (without which such a thing as a 'path' would make no sense) has been forever standing around you?"

The physicist said nothing.

"But has this taken away one iota of your freedom in wandering through the forest?" asked the old man.

The physicist said nothing.

"Do you still need that thing, or shall I scrap it?" asked the old man.

The physicist looked abstractly at his thinking machine and rubbed his face.

"So then," asked the old man of the thinking machine, "time and space exist all once, all possible parallel universes exist all at one moment, or spacetime is created anew in each moment, by matter and by thought – which is true?"

"Neither," said the machine, "both, it's time for lunch."

"And," said the old man turning to the physicist, "what about you, what do you say – what is true?"

"Just this" he answered, looking around at the forest, and went home, leaving the thinking machine where he'd dropped it, by the side of the road, a road on which no old man appeared, or ever had.

