

THE INVENTOR

The Time Traveler (for so it will be convenient to speak of him) was explaining a recondite matter to us. His pale grey eyes shone and twinkled, and his usually pale face was flushed and animated. The fire burnt brightly, and the soft radiance of the incandescent lights caught the bubbles that flashed and passed in our glasses. Our chairs, which he had designed, caressed us rather than submitted to be sat upon. There was that luxurious after-dinner atmosphere, when thought runs gracefully free. And he put it to us in this way — marking the points with a lean forefinger —

recondite: little-known; beyond ordinary understanding

flushed: red from strong feeling

incandescent: glowing with heat [Note that reliable electric lights bulbs had been only recently invented, around 1880, and that in the Time Traveler's time, around 1895, electric lighting in homes was still fairly new. As you will see, in his home, the Time Traveler still uses candles as well as electricity for lighting.]

bubbles: These bubbles are in the sparkling wine (such as Champagne) that the men are drinking.

caressed: touched gently

lean: thin

as we sat and lazily admired his earnestness over this new paradox (as we thought it).

“You must follow me carefully. I shall have to contradict one or two ideas that are almost universally accepted. The geometry, for instance, they taught you at school is founded on a misconception.”

“Is not that rather a large thing to expect us to begin upon?” said Filby, an argumentative person with red hair.

“I do not mean to ask you to accept anything without reasonable ground for it. You know of course that a mathematical line, a line of thickness *nil*, has no real existence. They taught you that? Neither has a mathematical plane. These things are mere abstractions.”

“That is all right,” said the Psychologist.

“Nor, having only length, breadth, and thickness, can a cube have a real existence.”

earnestness: deep sincerity and seriousness

paradox: a statement that seems to contradict itself but may nevertheless be true, for example, “Less is more.”

nil: zero; nothing

psychologist: a scientist who studies the mind and behavior

breadth: width; the measurement of something from side to side

“There I object,” said Filby. “Of course a solid body may exist. All real things—”

“So most people think. But wait a moment. Can an instantaneous cube exist?”

“Don’t follow you,” said Filby.

“Can a cube that does not last for any time at all, have a real existence?”

Filby became pensive. “Clearly,” the Time Traveler proceeded, “any real body must have extension in *four* directions: it must have Length, Breadth, Thickness, and—Duration. But we tend to overlook this fact. There are really four dimensions, three which we call the three planes of Space, and a fourth, Time. There is, however, a tendency to draw an unreal distinction between the former three dimensions and the latter, because our consciousness moves in one direction along the latter from the beginning to the end of our lives.”

“That,” said a very young man, “that is . . . very clear indeed.”

pensive: thoughtful

latter: Used with *former* earlier in the sentence, the *former* refers to things or people mentioned first, while the *latter* refers to things or people mentioned second. (In this case, “the latter” refers to what the Time Traveler calls the fourth dimension, Time.)

“Really,” continued the Time Traveler, “this is what is meant by the Fourth Dimension. It is only another way of looking at Time. *There is no difference between Time and any of the three dimensions of Space except that our consciousness moves along it.* But some foolish people have got hold of the wrong side of that idea. You have all heard what they have to say about this Fourth Dimension?”

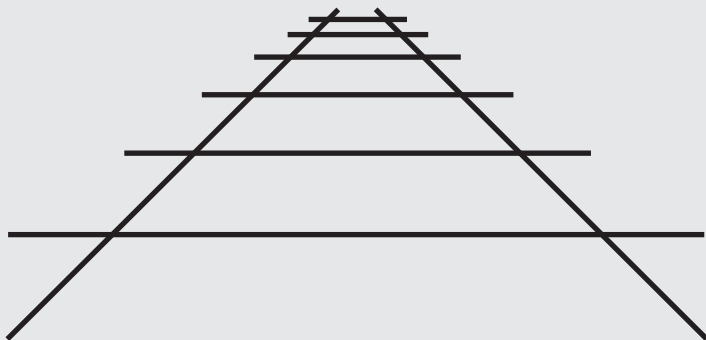
“I have not,” said the Mayor.

“It is simply this. That Space, as our mathematicians have it, is spoken of as having three dimensions, which one may call Length, Breadth, and Thickness, and is always definable by reference to three planes, each at right angles to the others. But some philosophical people have been asking why three dimensions particularly? Why not another direction at right angles to the other three? They have even tried to construct a Four-Dimensional geometry. You know how on a flat surface, which has only two dimensions, we can represent a figure of a three-dimensional solid, and similarly they think that by models of three dimensions they could represent one of four—if they could master the perspective of the thing. See?”

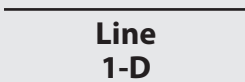
From 2-D to 3-D . . . to 4-D?

The Time Traveler points out that “on a flat surface, which has only two dimensions, we can represent a figure of a three-dimensional solid.” A flat surface—such as a piece of paper, or a painter’s canvas—has length and width. On such a surface, how can we create the illusion of a third dimension—of depth?

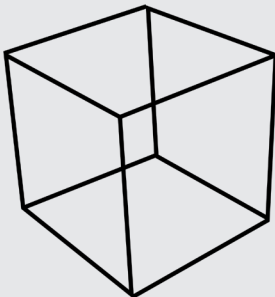
In the early 1400s, during the period of brilliant artistic innovation in Italy called the Renaissance, artists began using *perspective* to make two-dimensional images look three-dimensional. They gave their paintings an illusion of depth by making the people or objects in the foreground of a painting look bigger than those in the background. The artists also noticed that if you stand between two parallel lines that stretch into the distance, the lines seem to get closer together. For example, look at the drawing here representing railway tracks. The 2-D drawing looks 3-D because of the illusion created by perspective, as the lines get closer together.



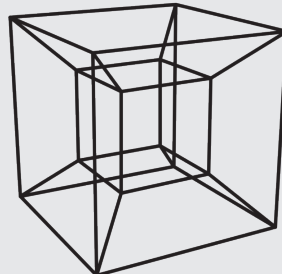
The Time Traveler says that mathematicians have “tried to construct a Four-Dimensional geometry,” and that “they think that by models of three dimensions they could represent one of four—if they could master the perspective of the thing.” Since the time of H. G. Wells, mathematicians have developed a 4-D model of a cube, called a *tesseract*. If you have read Madeline L’Engle’s novel *A Wrinkle in Time*, you might recall how she used the idea of a tesseract. Search the Internet to see animated models of a tesseract and for more discussion of possible dimensions beyond the three that we can perceive.



Square
2-D



Cube
3-D



Tesseract
4-D

“I think so,” murmured the Mayor, knitting his brows. “Yes, I think I see it now,” he said after some time, brightening briefly.

“Well, I do not mind telling you I have been at work upon this geometry of Four Dimensions for some time. Some of my results are curious. For instance, here is a portrait of a man at eight years old, another at fifteen, another at seventeen, another at twenty-three, and so on. All these are evidently sections, as it were, Three-Dimensional representations of his Four-Dimensioned being, which is a fixed and unalterable thing.

“Scientific people,” proceeded the Time Traveler, “know very well that Time is only a kind of Space. Here is a popular scientific diagram, a weather record. This line I trace with my finger shows the movement of the barometer. Yesterday it was so high, yesterday night it fell, then this morning it rose again, and so gently upward to here. Surely the mercury did not trace this line in any of the dimensions of Space generally recognized? But certainly it traced such a line, and

knitting his brows: tightening his eyebrows in a frown

as it were: an expression meaning, in a way

unalterable: not able to be changed

that line, therefore, we must conclude, was along the Time-Dimension.”

“But,” said the Medical Man, staring hard at a coal in the fire, “if Time is really only a fourth dimension of Space, why is it, and why has it always been, regarded as something different? And why cannot we move in Time as we move about in the other dimensions of Space?”

The Time Traveler smiled. “Are you so sure we can move freely in Space? Right and left we can go, backward and forward freely enough, and men always have done so. I admit we move freely in two dimensions. But how about up and down? Gravitation limits us there.”

“Not exactly,” said the Medical Man. “There are balloons.”

“But before the balloons, except for jumping, man had no freedom of vertical movement.”

“Still they could move a little up and down,” said the Medical Man.

balloons: The Medical Man is referring to hot air balloons, a method of transportation consisting of a large basket connected to a large bag. The balloon rises when the bag is filled with heated air. (*The Time Machine* was published in 1895, before the invention of the airplane.)

“Far easier down than up.”

“And you cannot move at all in Time,” said the Medical Man, “you cannot get away from the present moment.”

“My dear sir, that is just where you are wrong. That is just where the whole world has gone wrong. We are always getting away from the present moment. Our mental existences, which are immaterial and have no dimensions, are passing along the Time-Dimension with a uniform velocity from the cradle to the grave. Just as we should travel *down* if we began our existence fifty miles above the earth’s surface—”

“But the great difficulty is this,” interrupted the Psychologist. “You can move about in all directions of Space, but you cannot move about in Time.”

“That is my great discovery. You are wrong to say that we cannot move about in Time. For instance, if I am recalling an incident very vividly I go back to the instant of its occurrence: I become absent-minded, as you say. I jump back

immaterial: without physical substance; bodiless

uniform: unchanging; remaining the same

for a moment. Of course we have no means of staying back for any length of Time, any more than an animal has of staying six feet above the ground. But a man can go up against gravitation in a balloon, and why should he not hope that ultimately he may be able to stop or accelerate his drift along the Time-Dimension, or even turn about and travel the other way?"

"Oh, *this*," began Filby, "is all—"

"Why not?" said the Time Traveler.

"It's against reason," said Filby.

"What reason?" said the Time Traveler.

"You can show black is white by argument," said Filby, "but you will never convince me."

"Possibly not," said the Time Traveler. "But now you begin to see the object of my investigations into the geometry of Four Dimensions. Long ago I had a vague idea of a machine—"

"To travel through Time!" exclaimed the Very Young Man.

"That shall travel in any direction of Space and Time, as the driver determines."

Filby laughed.

“But I have experimental verification,” said the Time Traveler.

“It would be remarkably convenient for the historian,” the Psychologist suggested. “One might travel back and verify the accepted account of a great battle, for instance!”

“Then there is the future,” said the Very Young Man. “Just think! One might invest all one’s money and—”

“Of all the wild extravagant theories!” began the Psychologist.

“Yes, so it seemed to me, and so I never talked of it until—”

“Experimental verification!” I cried.

“The experiment!” cried Filby, who was getting brain-weary.

“Let’s see your experiment anyhow,” said the Psychologist, “though it’s all humbug, you know.”

The Time Traveler smiled round at us. Then, still smiling faintly, and with his hands deep in

verification: proof; confirmation of something as true or accurate

verify: to prove that something is true or accurate

extravagant: going beyond reason

humbug: nonsense; something intended to deceive or trick

his trousers pockets, he walked slowly out of the room, and we heard his slippers shuffling down the long passage to his laboratory.

The Psychologist looked at us. "I wonder what he's got?"

"Some clever trick or other," said the Medical Man, and Filby tried to tell us about a magician he had once seen, but before he had finished the Time Traveler came back.

