

# The Man From the Atom

**G. Peyton Wertenbaker**

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IF you are interested in Einstein's Theory of Relativity, you cannot afford to miss this story. It is one of the big scientific stories of the year and is worth reading and rereading many times. If the Theory of Relativity has been a puzzle to you, this story, written in plain English, cannot fail to hold your interest from start to finish. The thoughts expressed in this story are tremendous. It will give you a great insight, not only into the infinitely large, but also the infinitely small. Better yet, relativity is brought home to you in a most ingenious and easily understandable manner.—EDITOR.

## I

I AM a lost soul, and I am homesick. Yes, homesick. Yet how vain is homesickness when one is without a home! I can but be sick for a home that has gone. For my home departed millions of years ago, and there is now not even a trace of its former existence. Millions of years ago, I say, in all truth and earnestness. But I must tell the tale— though there is no man left to understand it.

I well remember that morning when my friend, Professor Martyn, called me to him on a matter of the greatest importance. I may explain that the Professor was one of those mysterious outcasts, geniuses whom Science would not recognize

because they scorned the pettiness of the men who represented Science. Martyn was first of all a scientist, but almost as equally he was a man of intense imagination, and where the ordinary man crept along from detail to detail and required a complete model before being able to visualize the results of his work, Professor Martyn first grasped the great results of his contemplated work, the vast, far-reaching effects, and then built with the end in view.

The Professor had few friends. Ordinary men avoided him because they were unable to understand the greatness of his vision. Where he plainly saw pictures of worlds and universes, they vainly groped among pictures of his words on printed pages. That was their impression of a word. A group of letters. His was of the picture it presented in his mind. I, however, though I had not the slightest claim to scientific knowledge, was romantic to a high degree, and always willing to carry out his strange experiments for the

sake of the adventure and the strangeness of it all. And so the advantages were equal. I had a mysterious personage ready to furnish me with the unusual. He had a willing subject to try out his inventions, for he reasoned quite naturally that should he himself perform the experiments, the world would be in danger of losing a mentality it might eventually have need of.

And so it was that I hurried to him without the slightest hesitation upon that, to me, momentous day of days in my life. I little realized the great change that soon would come over my existence, yet I knew that I was in for an adventure, certainly startling, possibly fatal. I had no delusions concerning my luck.

I found Professor Martyn in his laboratory bending with the eyes of a miser counting his gold over a tiny machine that might easily have fitted in my pocket. He did not see me for a moment, but when he finally looked up with a sigh of regret that he must tear his eyes away from this new and wonderful brain-child, whatever it might be, he waved me a little unsteadily into a chair, and sank down in one himself, with the machine in his lap. I waited, placing myself in what I considered a receptive mood.

“Kirby,” he began abruptly at last, “have you ever read your Alice in Wonderland?” I gasped, perhaps, in my surprise.

“Alice in—! are you joking, Professor?”

“Certainly not,” he assured me. “I speak in all seriousness.”

“Why, yes, I have read it many times. In fact, it has always struck me as a book to appeal more to an adult than to a child. But what—I can't see just how that is important.” He smiled.

“Perhaps I am playing with you unduly,” he said, “but do you remember the episode of the two pieces of cheese, if my own recollection is correct, one of which made one grow, the other shrink?”

I assented. “But,” I said incredulously, “certainly you cannot tell me you have spent your time in preparing magical cheeses?” He laughed aloud this time, and then, seeing my discomfort, unburdened himself of his latest triumph.

“No, Kirby, not just that, but I have indeed

constructed a machine that you will be incapable of believing until you try it. With this little object in my lap, you could grow forever, until there was nothing left in the universe to surpass. Or you could shrink so as to observe the minutest of atoms, standing upon it as you now stand upon the earth. It is an invention that will make scientific knowledge perfect!” He halted with flushed face and gleaming eyes. I could find nothing to say, for the thing was colossal, magnificent in its possibilities. If it worked. But I could not resist a suspicion of so tiny a machine.

“Professor, are you in absolute earnest?” I cried.

“Have I ever jested about so wonderful a thing?” he retorted quietly. I knew he had not.

“But surely that is merely a model?”

“It is the machine itself!”

## II

I was too astounded to speak at first. But finally, "Tell me about it," I gasped. "This is certainly the most fantastic invention you have made yet! How does it work?"

"I am afraid," suggested Professor Martyn, "that you could not understand all the technical details. It is horribly complicated. And besides, I am anxious to try it out. But I will give you an idea of it.

"Of course, you know that an object may be divided in half forever, as you have learned in high school, without being entirely exhausted. It is this principle that is used in shrinking. I hardly understand the thing's mechanism myself—it was the result of an accident—but I know that the machine not only divides every atom, every molecule, every electron of the body into two exactly equal parts, but it accomplishes the same feat in itself, thus keeping pace with its manipulator. The matter it removes from the body is reduced to a gaseous form, and left in the air. There are six wires that you do not see, which connect with the body, while the machine itself is placed on the chest, held by a small belt that carries wires to the front of the body where the two controlling buttons are placed.

"When the user wishes to grow, he presses the upper button, and the machine then extracts atoms from the air which it converts, by a reverse method from the first, into atoms identical to certain others in the body, the two atoms thus formed joining into one large particle of twice the original size.

"As I said, I have little idea of my invention except that it works by means of atomic energy. I was intending to make an atomic energy motor, when I observed certain parts to increase and diminish strangely in size. It was practically by blind instinct that I have worked the thing up. And now I fear I shall not be able to discover the source of my atomic energy until I can put together, with great care, another such machine, for I am afraid to risk taking this apart for analysis."

"And I," I said suddenly, with the awe I felt for such a discovery quite perceptible, I fear, in my tone, "I am to try out this machine?"

"If you are willing," he said simply. "You must realize, of course, that there are a multitude of unknown dangers. I know nothing of the complete effects of the machine. But my experiments on inanimate objects have seemed satisfactory."

"I am willing to take any risks," I said enthusiastically, "if you are willing to risk your great machine. Why, don't you realize, Professor, that this will revolutionize Science? There is nothing, hardly, that will be unknown. Astronomy will be complete, for there will be nothing to do but to increase in size enough to observe beyond our atmosphere, or one could stand upon worlds like rocks to examine others."

"Exactly. I have calculated that the effect of a huge foot covering whole countries would be slight, so equally distributed would the weights be. Probably it would rest upon tall buildings and trees with ease. But in space, of course, no support should be necessary.

"And then, as you said, one could shrink until the mysteries of electrons would be revealed. Of course, there would be danger in descending into apparent nothingness, not knowing where a new world-atom could be found upon which to stand. But dangers must be risked."

"But now, Kirby," remarked the Professor officially, "time passes, and I should like you to make your little journey soon that I may quickly know its results. Have you any affairs you would like to put in order, in case—"

"None," I said. I was always ready for these experiments. And though this promised to be magnificently

momentous, I was all ready. "No, if I return in a few hours, I shall find everything all right. If not, I am still prepared." He beamed in approval.

"Fine. Of course you understand that our

experiment must take place at some secluded spot. If you are ready, we can proceed at once to a country laboratory of mine that will, I think, be safe."

I assented, and we hastily donned our overcoats, the Professor spending a moment or two collecting a few necessary apparatus. Then we packed the machine in a safe box, and left his home.

"Are you all ready, Kirby?" The Professor's voice was firm, but my practiced ear could detect the slightest vibrations that indicated to me his intense inner feelings. I hesitated a moment. I was not afraid of going. Never that. But there seemed something partaking almost of finality about this departure. It was different from anything I had ever felt before.

"All ready, Professor," I said cheerfully after a brief moment.

"Are you going to magnify or minimize yourself?"

"It shall be growth," I answered, without a moment's hesitation there. The stars, and what lay beyond. . . It was that I cared for. The Professor looked at me earnestly, deeply engrossed in thought. Finally he said, "Kirby, if you are to make an excursion into interstellar space, you realize that not only would you freeze to death, but also die from lack of air."

Walking to a cabinet in the rear of the room, he opened it and withdrew from it some strange looking paraphernalia. "This," he said, holding up a queer looking suit, "is made of a great quantity of interlocking metal cells, hermetically sealed, from which the air has been completely exhausted so as to give the cells a high vacuum. These separate cells are then woven into the fabric. When you wear this suit, you will, in fact, be enclosed in a sort of thermos bottle. No heat can leave this suit, and the most intensive cold cannot penetrate through it."

I quickly got into the suit, which was not as heavy as one might imagine. It covered not only the entire body, but the feet and hands as well, the hand part being a sort of mitten.

After I had gotten into the suit, the Professor placed over my head a sort of transparent dome which he explained was made of strong unbreakable bakelite. The globe itself really was made of several globes, one within the other. The globes only touched at the lower rim. The interstices where the globes did not touch formed a vacuum, the air having been drawn from the spaces. Consequently heat could not escape from the transparent head piece nor could the cold come in. From the back of this head gear, a flexible tube led into the interior; this tube being connected to a small compressed oxygen tank, which the Professor strapped to my back.

He then placed the wonder machine with its row of buttons on my chest, and connected the six wires to the arm bands and other parts of my body.

Professor Martyn grasped my hand then, and said in his firm, quiet voice:

"Then goodbye, Kirby, for awhile. Press the first button when you are ready to go. May the Fates be with you!"

The Professor next placed the transparent head gear over my head and secured it with attachments to my vacuum suit. A strange feeling of quietness and solitude came over me. While I could still see the Professor, I could hear him talk no longer as sounds cannot pierce a vacuum. Once more the Professor shook my hand warmly.

Then, somehow, I found myself pressing down the uppermost of three buttons. Instantly there was a tingling, electric flash all through my body. Martyn, trees, distant buildings, all seemed to shoot away into nothingness. Almost in panic, I pushed the middle button. I stopped. I could not help it, for this disappearing of all my world acted upon my consciousness. I had a strange feeling that I was leaving forever.

I looked down, and Professor Martyn, a tiny speck in an automobile far below, waved up to me cheerfully as he started his car and began to speed away. He was fleeing the immediate danger of my growth, when my feet would begin to cover an immense area, until I could be almost entirely in space. I gathered my courage quickly, fiercely, and pressed the top button again. Once more the earth began to get smaller, little by little, but faster. A tingling sensation was all over me, exhilarating if almost painful where the wires were connected upon my forearms, my legs, about the forehead, and upon my chest.

It did never seem as though I was changing, but rather that the world was shrinking away, faster and faster. The clouds were falling upon me with threatening swiftness, until my head broke suddenly through them, and my body was obscured, and the earth below, save tiny glimpses, as though of a distant landscape through a fog. Far

away I could see a few tall crags that broke through even as had I, scorning from their majestic height the world below. Now indeed, if never before, was my head "among the clouds"!

But even the clouds were going. I began to get an idea of the earth as a great ball of thick cloud. There was a pricking sensation beneath my feet, as though I stood upon pine needles. It gave me a feeling of power to know that these were trees and hills.

I began to feel insecure, as though my support were doing something stealthy beneath me. Have you ever seen an elephant perform upon a little rolling ball? Well that is how I felt. The earth was rotating, while I no longer could move upon it. While I pondered, watching in some alarm as it became more and more like a little ball, a few feet thick, it took matters in its own hand. My feet slipped suddenly off, and I was lying, absolutely motionless, powerless to move, in space!

I watched the earth awhile as it shrunk, and even observed it now as it moved about the sun. I could see other planets that had grown at first a trifle larger and were now getting smaller, about the same size as the earth, a tiny ball of some two inches thickness.

It was getting much darker. The sun no longer gave much light, for there was no atmosphere to diffuse it. It was a great blinding ball of fire near my feet now, and the planets were traveling about it swiftly. I could see the light reflected on one side, dark on the other, on each planet. The sun could be seen to move perceptibly too, though very slightly. As my feet grew larger, threatening to touch it, I hastily drew them up with ease and hung suspended in the sky in a half-sitting position as I grew.

Turning my head away all at once, I observed in some surprise that some of the stars were growing larger, coming nearer and nearer. For a time I watched their swift approach, but they gradually seemed to be getting smaller rather than larger. I looked again at my own system. To my amazement, it had moved what seemed about a yard from its former position, and was much smaller. The planets I saw no longer, but there were faint streaks of light in circles about the sun, and I understood that these were the

tracks of the worlds that now moved about their parent too swiftly to be followed with the eye.

I could see all the stars moving hither and yon now, although they still continued to appear closer and closer together. I found a number lying practically on the plane of my chest, but above that they seemed to cease. I could now see no planets, only the tiny sun moving farther and farther, faster and faster along its path. I could discern, it seemed to me, a trend in its and its companions' paths. For on one side they seemed to be going one way, and the opposite way on the other. In front, they seemed to move across my vision. Gradually I came to understand that this was a great circle swinging vastly about me, faster and faster.

I had grown until the stars were circling now about my legs. I seemed to be the center of a huge vortex. And they were coming closer and closer together, as though to hem me about. Yet I could not move all of me away. I could only move my limbs and head in relation to my stationary body. The nearest star, a tiny bright speck, was a few yards away. My own sun was like a bright period upon a blackboard. But the stars were coming nearer and nearer. It seemed necessary for me to move somehow, so I drew my legs up and shot them out with all my force. I began to move slowly away, having acted upon what little material substance there was in the ether.

The stars were soon only a few feet apart below me, then a few inches, and suddenly, looking out beyond them, I was struck with the fact that they seemed to be a great group, isolated from a number of far distant blotches that were apart from these. The stars were moving with incredible swiftness now about a center near which was what I imagined to be the sun, though I had lost track of it somehow. They merged closer and closer together, the vast group shrunk more and more, until finally they had become indistinguishable as entities. They were all part of a huge cloud now, that seemed somehow familiar. What did it suggest? It was pale, diffused at the ends, but thick and white in the center, like a nebul—a nebula! That was it! A great light broke over me. All these stars were part of a great system that formed a nebula. It explained the mystery of the nebulae.

And there were now other nebulae approaching, as this grew smaller. They took on the resemblance of stars, and they began to repeat the process of closing in as the stars had done. The stars, universes within universes! And those universes but nebulae in another great universe! Suddenly I began to wonder. Could there be nothing more in infinity than universe after universe, each a part of

another greater one? So it would seem. Yet the spell was upon me and I was not ready to admit such simplicity yet. I must go on. And my earth! It could not even be found, this sphere that had itself seemed almost the universe.

But my growth was terribly fast now. The other nebulae were merging, it would seem at first, upon me. But my slow progress through space became faster as I grew larger, and even as they came upon me, like flying arrows now, I shot above them. Then they, too, merged. The result was a vast nucleus of glowing material.

A great light began to grow all about me. Above I suddenly observed, far away, a huge brightness that seemed to extend all over the universe. But it began definitely. It was as though one were in a great ball, and the nebulae, a sun-like body now, were in the center. But as I became larger with every instant, the roof-like thing diffused, even as before things had converged, and formed into separate bodies, like stars. I passed through them finally, and they came together again behind me as I shot away, another great body.

A coincidence suddenly struck me. Was not this system of a great ball effect with a nucleus within similar to what the electron was said to be? Could the nucleus and its great shell be opposite poles of electrical

energy, then? In other words, was this an electron—a huge electron composed of universes? The idea was terrible in its magnitude, something too huge for comprehension.

And so I grew on. Many more of these electrons, if such they were, gathered together, but my luck held and I passed beyond this new body thus formed—a molecule, I wondered? Suddenly I tired of the endless procession of stars coming together, forming ever into new stars that came together too. I was getting homesick. I wanted to see human faces about me again, to be rid of this fantastic nightmare. It was unreal. It was impossible. It must stop.

A sudden impulse of fear took hold upon me. This should not go on forever. I had to see my earth again. All at once, I reached down, and pressed the central button to stop.

But just as a swiftly moving vehicle may not stop at once, so could not I. The terrific momentum of my growth carried me on, and the machine moved still, though slower. The stars seemed shooting upon me, closing about me. I could see no end of them before me. I must stop or they would be about me.

Closer in they came, but smaller and smaller. They became a thousand pinpoints shooting about me. They merged into a thick, tenuous cloud about me, thicker and thicker. I was shooting up now, but my growth had stopped. The cloud became a cold, clammy thing that yielded to the touch, and—and it was water! Yes, pure water! And I was floating in it. . . .

Years. . . .

Suddenly I shot up, out of the water, and fell back. Strength returned to me, and warmth, and love of life. It was water, something I knew, something familiar, a friend. And so I swam, swam on and on, until my feet touched bottom, and I was leaping forth out of the water, on to the sand. . . .

### III

There is no need to drag the tale out. I awoke finally from an exhausted sleep, and found myself in a world that was strange, yet familiar. It might have been a lonely part of the earth, except for an atmosphere of strangeness that told me subconsciously it was another world. There was a sun, but it was far distant, no larger than my moon. And vast clouds of steam hung over the jungles beyond the sand, obscuring them in a shimmering fog, obscuring the sun so that it danced and glimmered hazily through the curtain. And a perpetual twilight thus reigned.

I tried to tell myself I was in some strange manner home. But I knew I was not. At last, breaking beneath the weight of homesickness and regret, I surrendered to a fit of weeping that shamed my manhood even as I wept. Then a mood of terrible, unreasoning anger against Fate enveloped me, and I stormed here and there about the beach.

And so, all through the night, I alternately wept and raged, and when the dawn came I sank again in peaceful slumber. . . .

When I awoke, I was calm. Obviously, in stopping I told myself I had been left in a cloud of atoms that proved to be part of another group of matter, another earth or atom, as you will. The particular atoms I was in were part of the ocean.

The only thing to do was to return. I was ashamed of my madness now, for I had the means of return. In the third button . . . the bottom button. I saw no reason for delay. I splashed back into the water, and

swam hastily out to the point where it

seemed I had risen. I pushed the lowest button. Slowly I felt myself grow smaller and smaller, the sense of suffocation returned, only to pass away as the pinpoints shot about me again, but away this time. The whole nightmare was repeated now, reversed, for everything seemed to be opening up before me. I thrilled with joy as I thought of my return to my home, and the Professor again. All the world was friend to me now, in my thoughts, a friend I could not bear to lose.

And then all my hopes were dashed. How, I thought, could I strike my own earth again? For even if I had come to the right spot in the water to a certainty, how could I be sure I would pass between just the right cloud of molecules? And what would lead me to the very electron I had left? And, after the nucleus, why should I not enter the wrong nebula? And even if I should hit the right nebula, how should I find my own star, my own earth? It was hopeless, impossible! . . . And yet, so constituted is human nature that I could hope nevertheless!

My God! Impossible as it is, I did it! I am certain that it was my own nebula I entered, and I was in the center, where the sun should be. It sounds fantastic, *it's* fantastic. The luck of a lifetime, an infinity, for me. Or so it should have been. But I looked where the sun ought to be found, in the central cluster. I halted early, and watched long with a sinking heart. But the sun—was gone!

I lay motionless in the depths of space and I watched idly the stars that roamed here and there. Black despair was in my heart, but it was a despair so terrible that I could not comprehend its awfulness. It was beyond human emotion. And I was dazed, perhaps even a little mad.

The stars were tiny pinpoints of light, and they shot back and forth and all around like purposeless nothings. And ever would they collide, and a greater pinpoint would be born, or a thousand pieces of fragments would result. Or the two might start off on new tracks, only to collide again. Seconds it took them to cover what I knew to be billions of trillions of light-years.

And gradually the truth dawned upon me, the awful truth. These stars were suns, even as mine had been, and they grew and died and were reborn, it seemed now, in a second, all in a second. Yet fair races bloomed and died, and worlds lived and died, races of intelligent beings strove, only to die. All in a second. But it was not a second to them. My immense size was to blame on my part.

For time is relative, and depends upon size. The smaller a creature, the shorter its life. And yet, to itself, the fly that lives but a day has passed a lifetime of years. So it was here. Because I had grown large, centuries had become but moments to me. And the faster, the larger I grew, the swifter the years, the millions of years had rolled away. I remembered how I had seen the streaks that meant the planets going about the sun. So fast had they revolved that I could not see the circuit that meant but a second to me. And yet each incredibly swift revolution had been a year! A year on earth, a second to me! And so, on an immensely greater scale, had it been as I grew. The few minutes that meant to me the sun's movement through the ether of what seemed a yard had been centuries to the earth. Before I had lived ten minutes of my strange existence, Professor Martyn had vainly hoped away a lifetime, and died in bitter despair. Men had come

and died, races had flourished and fallen. Perhaps all mankind had died away from a world stripped of air and water. In ten minutes of my life. . . .

And so I sit here now, pining hopelessly for my Mother Earth. This strange planet of a strange star is all beyond my ken. The men are strange and their customs curious. Their language is beyond my every effort to comprehend, yet mine they know like a book. I find myself a savage, a creature to be treated with pity



and contempt in a world too advanced even for his comprehension. Nothing here means anything to me.

I live here on sufferance, as an ignorant African might have lived in an incomprehensible, to him, London. A strange creature, to play with and to be played with by children. A clown . . . a savage . . . ! And yearn as I will for my earth, I know I may never know it again, for it was gone, forgotten, unexistent a trillion centuries ago. . . .!

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