

The Hand and the Pebble

A young boy stood near the edge of a lake beneath a cloudy sky. He bent down and picked up a small, smooth pebble from the ground, and hesitated for a moment before tossing it into the water, scattering ripples across the surface of the lake.

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Long, long ago...

It was the very beginning. Time had yet no meaning and space had yet to form. All of comprehensible existence occupied virtually no volume at all. Every particle of the universe was bound in one tightly packed speck of matter, where there was no distinction between here and there, or now and later. Within the speck, there was everything; outside of it, nothing. Such was the state of affairs, and so it remained for a period of time that could not be measured.

During this stage, there was a sweet sense of harmony, a pervasive aura of peace that could be felt but not described. It was a consequence of the supreme form of co-existence, perhaps; a conception of unity that could only be experienced when all of the matter of the universe was bound as one object. As long as this timeless phase would go on, the feeling would endure.

Needless to say, that did not last. Abruptly, the single speck of mass lost its ability to contain itself, and it ultimately exploded. Particles formed protons, electrons, and neutrons, and began to take up space, flying out in every direction at dizzying speeds. The notions of time and volume instantly took form. The universe as we know it was born, and the supreme co-existence vanished altogether.

But it was not forgotten. The matter of the universe could not clearly remember the details of its primary existence, but it could certainly sense a distinct difference between that original stage of time and this new one. No longer was there peace and harmony; particles that once shared the tightest bonds of unity would now violently repel each other with aggressive passion. Where the old state of affairs had thrived on closeness and density, the new one would demand expansion and the further occupation of space. Amidst the scrambling chaos, one single proton thought fondly of the past and struggled to retain his fading recollection of how wonderful things had once been.

Eventually, particles began to bond together, resulting in the formation of larger bodies of matter. Stars were formed, planets created, and chunks of rock hurtling about amid the rest of the universe. The bonds were nowhere near as tight as they had once been, and the volume of existence continued to expand as mass pushed ever outwards, but it was still bonding, and the proton was glad of it. He found himself contained within the nucleus of a carbon atom, used to build up a much larger celestial structure.

The other protons composing this nucleus were stiff, pushy fellows, and our proton felt it would be in his best interest to distance himself from them as much as possible. He also felt the need for a unique name to distinguish him from the other protons, because being thought of as simply "a proton" associated him with the rude and inconsiderate behaviour of his companions - the very idea of this was too painful to

endure. So, the proton began to call himself "P134", an arbitrary name that he was mildly pleased with, and spent most of his time surrounded by the much gentler neutrons within the nucleus.

One of these neutrons, in particular, was very friendly towards P134. Unlike the other particles P134 had met in his existence, this neutron also seemed to remember exactly how peaceful and united the universe had once been. She and P134 would spend all of their time together in the nucleus, laughing and chatting and enjoying each others' company. Being together made P134 feel almost as good as he had back in the beginning, before the explosion. He knew that his neutron friend, whom he had given the name "N247", felt the same way. There was clearly a closer bond between the two than any other pair of particles in the universe.

This happy arrangement continued for several millions of years, a period far too short, P134 would think in retrospect. Alas, it could not stay forever. The star that the nucleus was a part of was getting older, and its supply of energy was running low. Eventually, the atom containing P134 and N247 was chosen to undergo a fission reaction to provide an energy boost. The explosion was quick; one nucleus became two, and P134 and N247 were all at once separated, with no hopes of ever reaching each other again.

P134 did not know how long he floated about space aimlessly after that. He went on to form new atoms, such as lithium, helium, and beryllium, but the pain of his past loss did not allow him to develop any more relationships with his fellow subatomic particles. Every time, he would surround himself with neutrons, taking advantage of their willingness to leave him in peace as he desired. Every time, the atom would eventually undergo a fission reaction, and the nucleus would again be shattered to produce energy, sending P134 off in a different direction. Every time, he tried to enjoy the feeling of a new beginning, but every time, he was forcefully reminded of N247, and the memories would send him into new bouts of depression.

After one particularly violent fission reaction, when P134 was still trying to collect himself from the aftermath of the explosion, he found himself swept up into the nucleus of a new carbon atom. This was the first carbon atom P134 had been a part of since he had met N247, and the feeling of being surrounded by five other protons evoked a painful wave of nostalgia. P134 attempted to brace himself for another abrupt fission reaction to come when he realized that there was something different this time.

The previous atoms P134 had been a part of were always used to make up stars. There would be a lot of heat and light and noise, and P134 was very accustomed to it by now. This time, however, there was no light; the absence of photons was very noticeable. The particles were moving much more slowly, as well; there was clearly much less heat radiating from this object. P134 soon realized that this was not a star at all; he was being used to compose an asteroid, a rock flying around space.

Upon making this discovery, for the first time in eons, P134 began to see a shimmer of hope. Having been around for quite a while, he knew that only stars had the energy to facilitate nuclear reactions. The chance of a space rock employing a fission reaction was literally zero. Whatever particles P134 was packed with now, they were here to stay.

But what particles were these? There were the five other protons and six neutrons typical of carbon atoms. P134 knew from experience that hanging around other protons was rarely a good idea, so as usual he surrounded himself by the neutrons, who, as always, seemed nice enough. What was shocking, though,

was that the other protons of this nucleus weren't as ill-mannered as those that P134 was so used to being around. They weren't as jovial and friendly as N247, by any means, but they made an effort to be warm and kind, which was certainly more than anything P134 had come to expect from other protons. He guessed that it was because once the threat of being split up was gone, particles were no longer afraid of growing attached to their co-nuclear partners. Like P134, many protons had experienced a shaking loss early on in existence, and were unwilling to let it happen again. However, now that there was no chance of that happening in the asteroid, particles were more willing to open up and get to know each other. This was clearly a different ideology than the aggressive fight for space that had controlled the universe after the first explosion, and P134 began to feel happy once again. It was almost as nice as the original harmony he still remembered and longed for.

The asteroid did not undergo any fission reactions, but it did have a few startling experiences of its own. Large chunks broke off after collisions with other rocks floating around the universe, but being packed safely within a nucleus, P134 was not separated from his new friends. Eventually, the asteroid was caught in the gravitational pull of a much larger planet, and the entire asteroid was pulled towards the surface, where it crashed and shattered into dust.

This was an entirely new experience for P134 as well as the other particles in his nucleus, and they all waited excitedly to see what would happen next. With a twinge of sadness, P134 wished that he could see N247 again and experience this new world with her, but he knew that that was impossible. Besides, he had his new proton and neutron friends to enjoy this adventure with.

The dust settled and became packed into the foundations of the planet as time passed. The planet was much more elementally diverse than any other body P134 had ever witnessed; there was nitrogen and phosphorus and potassium and silicon and, to his amazement, an almost unholy union of hydrogen and oxygen atoms in copious doses all over the planet. Surely such a travesty would be frowned upon in other areas of the universe; the two elements clearly did not belong together.

The carbon atom P134 became integrated with the soil on the surface of the planet. Soon, a strange new material made up of other carbon atoms, among others, appeared in the soil, and P134 found his atom being absorbed by this strange new entity to form a part of it. This new object, unlike the stars or the asteroid, seemed to grow as time passed. P134 wondered if this was due to its frequent exposure to that indecent mixture of hydrogen and oxygen. He was uncertain, but it felt to him as though his new host was alive. Whatever that meant.

The living thing continued to grow, and P134's atom climbed higher and higher above the ground. The atom soon found itself in the brilliant red coating of a stiff new substance growing off of the object. None of the particles in the atom knew what was going on, but they felt suspicious of their host and of all things living. When one day, the red object was plucked off of the main living item, the atoms all gave a collective cheer and looked forward to the next part of their existence.

The atoms in the red object were all hustled around so much over the next few days that none of them could keep track of what was going on. Finally, after about a week had passed, a huge physical force tore apart the red object, and the atoms that had remained together throughout the ordeal were split up. The force was not strong enough, however, to tear apart the particles within the atoms themselves, so P134 was still attached to his proton and neutron friends in his nucleus.

The carbon atom was then sent to an area rich with chlorine atoms. There was a noticeable lack of oxygen and nitrogen atoms in this new place; they had been much more common before. A few days later, the atom was whisked off again, and after much ordeal, P134 finally found himself back in exposure to the gaseous oxygen and nitrogen atoms, an environment which he was now used to and found quite pleasant.

Judging by how much movement the atom was subject to in its new location, P134 suspected that this new object was alive and much more mobile than his last living host. Indeed, after a few days of paying attention to the behaviour and movement of his host, P134 guessed that his atom was part of a much larger living creature, and probably on a limb that was involved in much of the touching and object interaction that the creature engaged in. P134 decided that his atom was on the surface of the hand of a human, and then wondered how he could know so much about something that was so alien to him.

Being on the hand of a human had its decided advantages. The human seemed to have an affinity to touching everything he could, and as such, P134 was exposed to new and interesting materials every day. Whenever the human held anything for an extended period of time, P134 and his proton friends would chat with the atoms in the object the human was holding, and in this way, P134 made many new friends very quickly. Despite this, P134 always felt there was something missing in his life, and he felt he could never be truly happy without N247. He had given up all hope that he would ever see her again...

...until one day, when P134 had a foreboding feeling that something important was going to happen. He did not know how, but he sensed that N247 was nearby. P134 knew that it was ridiculous and absurd, but he found himself wishing that his host would find and touch the object that contained N247...

As if he had heard P134's silent, desperate pleas, the human moved his hand to touch a mass of carbon atoms, and P134 found himself propelled straight into contact with none other than N247 herself. P134 was shocked; after so many billions of years of being apart, here they were, together again... no longer within the same atom, but still close enough to sense each other, to feel each others' presence...

P134 couldn't say anything. He was still recovering from shock, wondering if he would wake up from a dream. N249 didn't say anything either, and an awful realization dawned upon P134... perhaps she had not missed him, as he had missed her... perhaps she did not even remember who he was... this new thought was unbearable...

Then she looked at him, and from the way she gazed at P134, his doubts vanished. He knew that she remembered him, longed for him, and wanted to be with him. There was no need for words; they both knew what had to be done.

Within an atom, there are tremendous forces tying particles together. It is impossible to pull apart two protons from a nucleus without releasing immense amounts of energy in a fission reaction. The force holding two separate molecules together, however, is much less powerful. Molecules of atoms can break apart from those around them very easily in comparison. Many molecules do it on their own when they decide that an object they came in contact with is a more preferable location than the object they are currently on. Both P134 and N247 knew this was possible, although it did require quite a bit of effort from the atoms in the molecule. They both felt, though, that in this case, it would be well worth the effort.

Maysum Panju

All N247 had to do was break her molecule off of the block of mass it was currently sitting on, and cling to the human hand that P134 was attached to. The plan was simple; the molecules involved were fine with the movement and were willing to exert the effort to pull it off. The problem, however, was time.

P134 knew that his host loved to pick up objects and put them down again almost immediately. If that happened now, it was possible that P134 and N247 would be separated for another several billion years. Barely a second had passed since the two atoms found themselves thrust together, but P134 knew that there wasn't time to spare, the move must be executed now.

The problem, however, was that the move was taking more work than was anticipated. The molecule N247 was part of had stronger attachments to its object than they had realized. Slightly panicking, P134 commanded the atoms on the hand around them to pull N247's molecule with all of the strength they could muster. To his relief, the molecule started to loosen from its object and was now closer to being fully integrated into the hand as well. The atoms continued to struggle; the ones on the hand were pulling as hard as they could, and the ones on N247's molecule were doing their best to rip the bonds tying them to the object. It was working... P134 could sense victory... he would once again be with N247, and he could be happy at last...

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The young boy hesitated for a moment before tossing the pebble into the water, blissfully oblivious to how pivotal this one small, insignificant action was to a saga as old as the universe itself.