

LET THERE BE LIGHT

"This extraordinary session of the Universal Association for the Resolution of Scientific Quandaries is now called to order," intoned Dr. Gamma Epsilon, Chairperson of that august body.

The meeting had been called rather suddenly. A grave and unforeseen situation had arisen from a highly secret area of research. The combined expertise of leading participants in all areas of scientific endeavor, including the so-called soft sciences was required for its resolution.

The session had been arranged in two tiers. Seated about a large round table, experts were free to question the speaker outlining the problem and comment on any point made at any time during the presentation. From the amphitheater, other invited guests and observers could interrogate the speaker and the experts or offer further comments or solutions once the problem had been presented. The situation was considered so grave that no stone was to be left unturned and no suggestion to be dismissed out of hand, no matter the source.

Dr. Epsilon went on to introduce the principal speaker. "We are now facing a very critical situation. It arises from the work of our Astro-Physics division but its ramifications are so extensive, that everyone on this planet, indeed, even our universe, will be affected. Thus we felt it necessary to consult with as wide a group of experts and non-experts as possible. The Head of the Astro-Physics Division has been so devastated by this crisis, that he is incapable of attending this session. I would now like to introduce Dr. Nova Stellar, Acting Head of the division, who will present both the background to the problem and the problem itself."

Dr. Stellar took the podium and related the following to incredulous ears.

"As I am sure most of you know, what we consider our universe is that volume of space containing all the matter and energy in existence. Our universe is expanding. If this postulate is true, and all the evidence points to its veracity, we cannot help but inquire into the nature of the space that it is expanding into. We assume that it is space totally devoid of any matter or energy, in other words, true space. Space as we know it, is adulterated with all sorts of matter and energy forms. Further, any attempt to qualitatively and quantitatively view empty space is thwarted by the 'Uncertainty Principle' since we would have to contaminate it with necessary energy to measure its characteristics. Also, if we try to view that space into which we are expanding, all we are doing is contributing to its expansion, thus incorporating true space into our universe where it would be no longer as empty as it once was. It seemed an insoluble problem and as it turned out that is exactly what it was. However, we were all so fascinated by the question, we could not let go of it."

"Then why did you bother with it all?" a ponderous voice queried from the table of experts. He was identified as Dr. Infinity, a leading astro-physicist. "Science should only ask those questions that have a reasonable chance of being answered. Why are you wasting our time?" All the other experts around the table nodded in agreement, as well as many in the general audience.

There were some adventurous persons present who urged Dr. Stellar to reply.

"It is hard to let something go when a great deal of time and effort has been invested into posing and attempting to solve the problem. Furthermore, if there is or was a way to learn something about true space, think what a major advance in our knowledge about why and how we exist that could be. However, we did not call this meeting for answers to the impasse just outlined. We have stumbled upon a much greater problem.

One of our bright young scientists then came up with what we thought was an ingenious approach. She suggested that if we managed to isolate a large area of space, from which we would withdraw all matter and energy, we would have a starting point located within our universe. Hopefully we could study it at our leisure, once we figured out how. Even if we could not get into it, we would be able to make some macroscopic observations about it. Much to our surprise, we succeeded in segregating a large portion of space that was sparse in matter and energy, by putting a field around it, allowing all the matter and energy forms in it to exit from it but not allowing any back into it. We were able to measure the output of that space. When it reached zero, we waited another number of years, always monitoring that output, until we were convinced that it contained virtually no more matter or energy. In other words, we believed that we had created our version of true space."

At this point in her narrative, Dr. Stellar paused, sighed, took a deep breath and continued.

"I am sure that you are all wondering what we gleaned from our observations of this totally new phenomenon." She paused again for effect and then very calmly went on. "We learned absolutely nothing. That example of true space just sat there like a lump of inanimate clay. Absolutely nothing happened. It showed no signs of any type of dynamism. We waited and waited, growing more and more frustrated. Was our quest for the meaning of existence not to be advanced one iota? After all our efforts, were we back where we had started?"

Once again a dissatisfied murmur arose from the table of experts. Dr. Infinity stood up, waving his arms portentously but before he could say anything Dr. Stellar interjected.

"Please bear with me. It is at this juncture in our work that we made a decision that had totally unforeseen consequences. It led to the problem we all face, and for which this meeting was called. Let me continue."

Despite looks of exasperation, the grumbling ceased.

"After much fervent discussion, we decided to follow a suggestion advanced by one of our younger more adventuresome fellows. I will not reveal who that person was, since we all agreed to share the responsibility for the course we were embarking on. Simply put, we impregnated our sample of true space with a measured burst of monochromatic electromagnetic energy from the radio wave band spectrum. We also inserted a series of low energy detectors that allowed us to monitor what was taking place. This decision was not taken lightly but we felt that we had no choice but to see what changes, if any, would take place because of the new conditions inside true space. Much to our consternation, again nothing happened. We then inserted the whole radio wave

spectrum and again nothing much transpired. Perhaps this was to be expected because of the low quanta energy involved.

Again, our daring young pioneer came up with a radical proposition and again, after much fervent debate, we acquiesced. We infused our true space with the whole spectrum of electromagnetic energy as we know it, and in rather large amounts. New detectors were reinserted to allow us to measure and observe. Our decision was based upon the need to create a set of dynamic conditions, that is, conditions that would cause changes to happen. If we had known how successful we would be, we would have scrubbed this whole line of inquiry."

Again Dr. Stellar paused, wiped her brow and imbibed from a flask containing a strange looking liquid which seemed to provide her with some relief from the anxiety she had evinced from the moment she had starting speaking. The tension in the amphitheater had grown palpable. Even the ponderous Dr. Infinity was at the edge of his seat with his head in his hands as if he suspected what was coming. He was heard to mutter to the scientist sitting next to him, "I fear they've opened up Pandora's box." In a manner of speaking he was absolutely correct.

Dr. Stellar then continued.

"There were three immediate observable consequences. The first, unpredictably, was that the energy did not appear to distribute itself evenly throughout and that differing energy densities were being apportioned in a fashion that made no sense. In other words, certain regions contained higher amounts of energy, whereas others accommodated very little. The latter consisted only of low frequency energy forms such as radio waves. However, these patterns changed with time. What was a low density energy region became one of high density or medium density with the reverse also occurring in an inconstant fashion. We never observed an even dispersion of the energy in our once true space.

Another mysterious effect had to do with "time". All the changes just mentioned transpired at a speed totally unknown to us or to many of our instruments, which required modifications. Somehow, "time" seemed to have become compressed in this new area of space.

Finally, the whole enclosed volume of space that we had impregnated with energy started to pulsate and each succeeding pulse grew larger in amplitude. It was this phenomenon that caused us great concern. We tried, in vain, to arrest it."

A group of young scientists who had been paying rapt attention couldn't refrain from crying out impatiently and in near unison, "Why would you want to stop these pulsations? You were on the verge of great discoveries."

Dr. Infinity turned to them with a scowl and suggested that they should get their brains in order.

"Don't you realize the disaster that can result from these pulsations for our world and our universe?"

This quietened the interruptors, allowing Dr. Stellar to proceed.

"I am afraid that Dr. Infinity is correct. Since each contraction was growing larger, the energy therein was being contained in a smaller and smaller space. What alarmed us was contemplating what was going to happen when the space had grown so small, it could no longer contain the energy therein. Well, our fears were realized and then some. What transpired was a compression of the energy into a space the size of a needle's head. At this point, which we labeled a singularity, it exploded with a magnitude impossible to measure."

Again Dr. Stellar hesitated, glanced out at her audience and took a drink from her flask. Dr. Infinity rather impatiently raised his voice.

"Why don't you get to the bottom line and tell us the worst?" he queried.

"Because I don't know exactly what the worst is," Dr. Stellar replied and then continued nervously.

"I will now bring you up to date. From the moment of the explosion, the space and the energy therein started to expand alarmingly fast with new happenings occurring at a fantastic rate. As I previously mentioned, it is as if time had become compressed in this new reality, so that things could take place at a much faster pace in it than in our own reality. Next, as of this moment, there is no evidence that the expansion is slowing down. In other words this expansion may be infinite, although that is highly unlikely. Yet it will definitely overtake and incorporate our universe in about five years of our time.

That is not the worst of it. At first we believed that we could adapt to the new circumstances or alter them to fit our requirements by using our scientific expertise. Thus we felt that this new entity was not an insurmountable threat. What we had not grasped was that, once again, the energy was not being evenly distributed and, more importantly, in certain regions of high energy density, the energy was being converted to matter in the form of stars, with accompanying solar systems in many instances. These stars were aggregating into galaxies, somewhat similar to our universe. Further, as in ours, the laws of gravity seemed to hold, as we were able to measure the effect on electromagnetic radiation by gravitational fields and the forces of attraction between some of these bodies."

A voice from the audience shouted.

"What is the problem? It seems to me that you have made a fabulous cosmological breakthrough. We appear to have learnt a great deal about the origins of our universe. Obviously there can be more than one."

"You are absolutely correct," Dr. Stellar replied. "We have also learnt something about how a very different life form originated and that is why this meeting has been convened. Purely by accident, as we were scanning a particular region of space in this new reality, we noticed some peculiar goings-on in the third planet from its sun in one of the solar systems. It had developed an oxygen/nitrogen atmosphere in direct contrast to ours which, as you know, consists of fluorine and radon. As with ours, one of its most common elements is silicon. Here, however, silicon is the basic element of life. There, it is carbon. Here life forms are very stable and evolution is much slower. In what appears to us to be a blink of an eyelash, life there took hold and evolved, first in very simple

forms and then to rapidly complicated living entities, with sophisticated technologies. All incorporate oxygen into their bodies and emit carbon dioxide.

There is also a large range of living things that do the opposite. Thus a natural symbiosis exists between the two. Yet it is the most knowledgeable among the living things that pose the greatest threat to themselves and their world. Unlike us, they are constantly at war with each other and their barbarism knows no end. They exploit each other and their environment with such apparent greed, ferocity, and lack of forethought that, hopefully, they will pose a threat only to themselves. However, they are very resourceful so that there is a good chance they will survive to that point in time when their universe will overtake ours, all because of the research we initiated.

As of this moment there is no way we can compete with them. Because of our relative inertness, to them we will appear as non-living entities to be manipulated as they wish. Even if they recognized us as sentient beings, and because of their primitive and savage character, we doubt that it would make any difference. Ironically, it appears that our first major mistake was to play a role similar to one of their mythical beings they call "God", when that entity commanded, 'LET THERE BE LIGHT'.

It is evident that if we do nothing, our existence, indeed our universe is going to come to a catastrophic end. That is the reason for this meeting. We have about five years of our time to solve this problem."

Everyone in the amphitheater appeared paralyzed as if in a state of shock.

Dr. Infinity stood up and stated, "I do not need five years. Insofar as there is no solution to this problem that we can discern, and since I do not wish to coexist with such monsters, I will end my existence immediately." Whereupon he removed a small vial from his briefcase, swallowed its contents and collapsed fatally. All the others rushed to follow his example. Each had with them similar vials of the most deadly potion known, a rare compound whose molecules consisted of two atoms of hydrogen and one of oxygen.

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