

CHAPTER 1

Two Short Stories

A Journey

I died last night and it was very interesting. Not nearly as bad as I thought it would be; quite a surprising experience you might say. It takes a moment of pain, pretty much like a pin prick, after the last breath, for our bodies to turn off all those intricately connected switches, sending a signal from the brain to all parts, that this is the end. First the brain dampens its buzzing circuits, then the heart ceases its contractions much as an engine grinds to a halt after the power is shut off and finally muscles, blood vessels, skin and bones relax. The word gets out to our red and white cells. The foreign bacteria and viruses who exist parasitically on and within us get the message. It is over; the system is inoperable. It is time to get out.

And I got out too. That's what I meant by this death experience being a surprising event. I never dreamed that there was more to me than skin and bones. But when I died I too departed, simply and easily, unshackled from the old carcass just as smoothly as slipping and sliding down a greased chute. You drift out, much as air leaves a slow leak in a tire. And before you know it, there you are, ethereal and invisible, floating around as a packet of energy and essence. Oh you know who you are, and who you were but it doesn't seem to matter. You are disengaged from the anchor and free. And it dawns on you that it was only a temporary thing, this occupation of the cumbersome, burdensome, corporal being.

I noticed one important fact right away. I was lighter than air and in no time was ascending up above the trees, past the tallest canyons of buildings, into clouds that now seemed abrasive and richly textured. But it was a simple matter for me to sway and bend with the tides of turbulent winds, all the while steadily penetrating upward until I broke through the clouds into the warm and refreshingly clear upper atmosphere and beyond. Much as a

balloon will float to an altitude which balances its buoyancy forces, so too I found my level in a region far from earth. And there to my surprise I found kindred souls, all of us units of energy and consciousness, identifiable by these characteristics much as before, when we knew each other by height, weight, skin color and voice. Depending on your energy density, you might settle in one region or another, nearer to or further from the earth and hence closer to or farther from the sun.

We live here for an indefinite period as far as I can tell. We'll stay until our energy levels are depleted, I'm told. And then? Well no one seems to know what comes next except there is a rumor that after the fun and relaxation of this new life, we are to be assigned another mission on earth (by God who is in charge) though no one can remember any previous transfers. It seems here we energy packets have no memories.

In God We Trust

(I) George was just an ordinary carbon atom, not too heavy, not too tall. His weight was exactly 12.01, the same as most of his fellow carbons. His spin orbitals were properly arranged, with two electrons in his inner K shell and four unpaired electrons in the L shell. His nucleus contained six neutrons and six protons as required, all nicely packed. Sure he knew some carbon atoms who were a little heavier, but they only constituted about one percent of all the carbons. George found contentment in knowing that he and his kind were very constant.

And they were everywhere, these carbon atoms, among the other hundred or more kinds of atoms in the world. Unlike the noble atoms like helium, neon and argon who disdained to join with the other atoms, carbons could be either alone and free and unattached or combined and married to other atoms to form family units. Alone, or joined to other carbon atoms, they could form the very durable and organized bonds of diamond or the less ordered, softer structure of graphite. Everyone said that the married carbon atoms were the fulfilled ones, for in marriage they transcended themselves and became part of an almost infinite variety of family units, each distinctive in size and weight and activity. Some, like the carbon-oxygen family were light and adventurous and floated beyond their substrate. Others when combined with metal atoms and other units became heavy and large and conservative and hardly capable of moving from one neighborhood to another.

It was a simple life which George (the ordinary carbon atom) led; mostly he was concerned with maintaining a stable, resting state for his electrons, trying to control his energy and avoiding those unseen forces which could destroy him. But this wasn't easy, for in the world there were mysterious forces at work which could disrupt his life. In ways which he and his fellow carbon atoms did not comprehend and at unpredictable times there would be unleashed from the heavens, storms of energy, sometimes as electrical flashes, and sometimes as great vibrations. Very destructive and dangerous were the high speed helium atoms, which could rip you apart. So could high speed electrons. And there was gamma radiation, the electromagnetic waves. In waves and quanta these pulses of energy would come, blanketing the world as if some holocaust was about to descend. But not everyone was affected. (Certainly the imperious, noble helium, argon and neon would be immune.) While most of the atoms shuddered during these storms, the unlucky ones were mesmerized and then activated. Their electrons jumped, their nuclei quivered as if in transfiguration, and in a frenzy they mated and formed family units. Now separated from their past, these new compounds no longer resembled their old cohorts. Sometimes the family units, in some preordained ritual, would join forces in a communal existence, sharing their new bonds.

George was a religious atom, as were most of the atoms he knew. He believed in an organized universe with his God in control. He accepted his life as an atom philosophically and was willing to be mated when his time came. He had blissful confidence that God was good, and that there was a hereafter. If God chose George to be mated, he would go willingly. He knew that ultimately God would return him to his single state. So George was a believer and found the inner strength to endure. Those terrible storms which arose from time to time were acts of God; God has a purpose.

On this warm and sunny summer day, at this time in history, George a carbon atom in amorphous association with his colleagues in a charcoal briquette, was thrust upon a metal grid, doused with a volatile liquid, exposed to a lit match and engulfed in searing flames.

"My God, why have you chosen me for your torture?" cried George. His electrons were excited; the stress of heat and temperature produced an instability that suggested the end of the world. And when it seemed that he would not survive, two oxygen atoms, also excited and vibrating sympathetically were suddenly there, with their electrons bound to his. And they were mated to produce carbon dioxide.

To be a carbon dioxide molecule is to be a colorless gas, representing a small elite group on earth. For George it meant a loss of identity, a subordination of his personality for the good of his family, and a sharing of his electrons which were so precious to him. But despite these compromises, and even allowing for the loss of his carbon cohorts, there was a positive side to his marriage; he was no longer a one-dimensional character, no longer immobilized. He could soar with the wind, dive into liquids and dissolve, diffuse through membranes and do things he never dreamed were possible. “God has been good to me; I am seeing and experiencing miracles,” he thought. “The God that brought the fire which caused me to suffer so much must have been testing me. He found me worthy, for have I not led a devout life. Now he has brought beautiful oxygens to my side. Surely God is good.”

But the freedom which George and his oxygens felt, the euphoric flights were to be short-lived. Unnoticed near the flames were immense mountains which alternately expanded and contracted, inhaling and exhaling huge quantities of air in the process and generating terrible wind storms. It was during one of these cycles that George was sucked into the cavernous interior of one of the mountains, pressed against the moist, sticky walls by the vacuum and forced through the membrane which was the outer layer of the walls and dumped into one of the cells.

Then the attack by exotic molecules began. First it was a pyruvic acid molecule, which surrounded George and his oxygens. Aided and abetted by catalysts which drained George of his resistive energy, the pyruvics easily weakened the bonds between George and his oxygens and dissolved the marriage. In the ensuing confusion there were some rapid rearrangements and when the struggle was over, George and his oxygens were tied to a pyruvic acid molecule. It was just the beginning of the nightmare for George, who now was being whirled rapidly and unstoppably in the cell. In this roller-coaster ride in the cell he mated temporarily with hydrogen and water, lost electrons and got them back, and was subjected to deforming physical stresses — until, dizzy and exhausted, George regained his senses to find himself part of an almost infinite sea of carbons, oxygens, nitrogens, phosphoruses and hydrogens. He was now but one miniscule part of a DNA molecule, one carbon atom bound to thousands of others in chains and helices, in a chemical prison. “Being part of DNA is to be the controller of the life process,” George was told. “We make the food and building blocks and supply the genes who enable our cell to survive and reproduce. Every atom is critical.”

So he was welcomed to the team, with a warning, “No independence is allowed here; all must work for the common good. Get out of line or neglect the instructions being passed on by the messengers, and the whole process is upset. No mutants are tolerated in this cell, so there can be no laxity. We are all comrades.”

(II) To be a virus is to be someone who cannot reproduce with your own kind. To be a virus is to be a parasite, living in host cells which supply your food for life and the means for reproduction. To be a virus is to be about one-twentieth of the size of the smallest organism capable of independent reproduction. It is not an easy life. You must live by your wits, but a virus is immortal as long as one of its species survives. Let one enter a host cell and identical viruses will be produced. Though new, they are the same as the old.

Mary accepted her life as a smallpox virus. She was larger than most and heavier. With a brick-like shape which gave her strength and a hexagonal protein head containing DNA (which was the reason for her intelligence), Mary could compete easily for the host cells against the other viruses who had poor quality RNA in their heads and weaker shapes.

She was born in a lung cell and quickly understood the peculiar existence of her kind — not being able to eat or engage in sexual activities in the usual way. To be with your fellow smallpox viruses was to look at your own image in a mirror. Why viruses were destined for this kind of life Mary attributed to the design of God.

“The God that invented the virus also created bacteria and the cells, so the viruses could survive,” she often said. “The God which causes the flames and heat which kill viruses also gives them special shapes for survival. And when God brings a plague of antibodies to destroy us in the blood streams, there must be a reason. He intends us no permanent harm, for he also causes the virus to become immune to these same antibodies, guaranteeing our survival. Though there will be times when living conditions become intolerable, God will always provide the means for survival; viruses are the chosen ones.” Mary believed in God, in His wisdom and omnipotence.

Mary the smallpox virus, born in a lung cell with hundreds of her sisters, in response to some primordial pressure, broke out of the cell of her birth and settled onto the exposed surface of the living lung. There she rested but briefly, for suddenly the ground wrenched, a distant rumble became audible and the wind velocity increased. Hugging the surface with her powerful legs, Mary cringed in fear of this irrational event, a storm which

threatened her life. In a fraction of a second a perfectly calm day produced a cataclysmic burst of wind which swept her out of her home and into the air. She had been expelled from the land of her birth by forces governed by her God, for reasons unknown to her.

Sailing through the air, seemingly weightless, Mary had time to observe this new world. In some frightening way she was exhilarated by the danger and freedom, neither cancelling the other exactly. “Has God a special mission for me?” she wondered as she floated by a charcoal grill which was aflame. The heat was intense but she was beyond its reach. “I don’t have much time to find a home. Where will I land?”

Mountain ranges loomed before her, positioned uniformly around the flames. Mary marveled at the symmetry of the landscape, thoroughly enchanted with the new vistas and unaware that she was rapidly approaching one of the mountains. She didn’t notice the periodic updraft which was drawing her toward the mountain top. The suction was getting stronger, the turbulent wind velocities were accelerating, her speed was increasing and she was now being buffeted badly. The joy of floating in this new world rapidly gave way to despair and an ineffective attempt to stabilize her flight. Sensing the hopelessness of her struggle, aware of the God-like dimensions of the forces at work, she succumbed to their will.

Mary did not crash into the mountain, but was swept instead into one of its cavities, impelled by a vacuum which also drew air, other viruses and bacteria. She crashed onto a lung surface and instinctively burrowed into its interstices. “I’ll be safe from the wind here, but my strength won’t hold up much longer without a host cell,” she thought. “I seem to have done this before; all this seems so familiar.” It was as if she were programmed by some grand designer.

Looking only for something familiar and comfortable she finally contacted a cell — a lung cell — and was surprised when the physical contact kindled a sexual stimulation previously unknown to her. Through her pores Mary exuded an enzyme which weakened the host cell’s membrane and rendered it more permeable. With her legs firmly attached to the cell she squatted, contracting the external sheath of her body and allowing her inner tube to penetrate the cell membrane. Now straining mightily, with a killing effort, Mary drained the DNA genetic material from her head, through her body tube and into the host cell. The process took only one minute but now Mary understood that this was her reason for existing. Through her the smallpox virus would continue to live: God had chosen her for the most important function of the universe. She also knew that

by her act she would die, for stripped of her DNA she was nothing. But death meant others would be born soon in her image. From Mary would come hundreds of smallpox viruses and she would be reborn. Hallelujah! She was immortal!

Old Mary died, but her DNA seeds were firmly implanted inside the host cell. Within minutes, the carbon atoms, the oxygens, nitrogens, phosphoruses and hydrogens of her DNA essence spread into the genes of the host cell. In less than one hour they had found their counterparts and had taken over the operation of the cell. Where formerly the DNA of the host cell had peacefully manufactured replacement parts, now they were overcome and the process was shut off. Instead of a pastoral existence, they were bullied into producing replicas of the smallpox virus, under exact instructions from Mary's messengers. First the DNA was to be assembled and condensed into a head. Next the legs and body were to be made and finally everything had to be covered with protein coat. It took a few hours to complete the operation and now hundreds of new Marys were contained within the spent host cell. Old Mary was dead, young Mary lived.

"A carbon atom is passive by nature," said George to a fellow atom as they worked on the DNA assembly line. "We're usually un-reactive unless highly stimulated. I accepted my fate when God converted me to carbon dioxide, and I can see a purpose in His drafting me into the DNA of this cell. The work is dull here but at least I feel part of a team. And we seem to be doing useful work. But when those dreadful smallpox atoms come in and force us to do their work, that's going too far. I will not build Mary viruses; these smallpox viruses are evil monsters who live parasitic lives, draining the life out of docile cells in their effort to proliferate. These fascists are also trying to force me to join one of their DNA molecules and become part of them. I'll not do it!"

But George didn't have much choice in the matter. He was forced to do the bidding of the smallpox messengers, assembling their DNA, until about halfway through one production run when the orders came for George to join the DNA which was being assembled as the head of a Mary virus. There is no resistance to such instructions since a virus enzyme is always present to break the bonds to recalcitrant atoms. So George the carbon atom was integrated into a smallpox virus.

"God is surely testing me in this new role he has chosen for me," said George, unhappily. "These are Godless creatures, and for me to aid in their destructive activities is offensive. I am a prisoner for reasons which God only knows."

Young Mary was beginning to stir, sensing that she was now complete as a smallpox virus.

“Thank you, God, for continuing the miracle of creation which proves that you are happy with us,” she said. “I hope I may be worthy of your trust and can carry out your wishes. I pledge my DNA to your service.”

George and Mary, Mary and George, were inseparable. George in slave labor, working against his will in the smallpox DNA helix, did his job as carbon atoms must. No carbon atom is unstable; carbon atoms do not break their bonds easily. He prayed that God would rescue him and restore his freedom. Young Mary, full of early bloom, energetic and fearless, probed at the host cell’s surrounding membrane in an effort to escape. She found a weakness in the membrane of this dying cell and easily plunged through, ready for adventure.

“God give me the strength and courage to persevere,” she said as she emerged from the cell.

(III) Mark had enjoyed sitting around the charcoal grill with his fellow students, eating the hamburgers and chicken. All of them were new to the university so it was fun to swap horror stories about registration difficulties and new professors. They represented the U.N. in microcosm, having come from so many different countries. One of the animated discussions they had that day was about religion, and whose was best. The Buddhists, Muslims, Hindus, Christians and Jews made their representations and when it was over, they agreed to disagree, each strongly determined that his religion was best (and contained the only truth about God).

Ever since that picnic a week ago, Mark felt a bit feverish, and now he noticed that chills, shaky spells and restlessness were added to his symptoms. He awoke one day with a severe backache, vomited and found he had a temperature of 105 degrees. There were faint, irregular blotches on his skin. His doctor told him the bad news: he had contracted smallpox; apparently his lungs were the primary infection site.

“What rotten luck,” Mark said to the doctor, knowing he would now have to miss some critical classes at the university. “How the hell did I get it?”

“Probably through one of the fellows from India or Africa or South America who were with you the day of your picnic.”

“God is punishing me for not defending him more forcefully,” Mark said sardonically.

The smallpox infection proved to be more virulent than they suspected; Mark had hemorrhagic smallpox which specifically affects the lungs and is the most dangerous form of the disease. In addition to the general symptoms and the skin lesions, and the damage to the liver and spleen, there is bleeding in the lungs with pneumonia arising as a secondary infection. Mark had never been in good health; as a student away from his parents he had further weakened himself by eating poorly. Thus this attack of smallpox became a very serious matter. Despite the best of medical care, despite inoculations to counteract the smallpox virus, Mark gradually slipped into a coma, the virus now too entrenched to be overcome by Mark's antibodies. He died two weeks after the initial infection.

"Why has God punished us?" asked his parents. "Mark was so young, so full of promise. His whole life was before him; there was so much he wanted to do with his life. What kind of God is this?"

"Isn't it ironic," said the mourners, "how it is always the good people whom God chooses to die early."

"Our duty is not to question God's will," replied the others. "He has a purpose, even if it is not obvious to us."

(No one asked whose God had killed Mark — whether it was the God of Buddha, or Jesus or Abraham. Or was it Mary's God or George's? So they laid Mark into the ground, hoping for a sign that this death was in God's name and would be for the betterment of mankind.)

(IV) Oh, how merry they were. A perfect climate for Mary viruses, they moved into one cell after another of Mark's lungs, organizing this cell and that one, generating more and more smallpox viruses at an accelerating rate. (George, on the DNA assembly line, was forced to work at a maddening pace, hardly daring to rest or think; there was only time to follow the orders of the messengers.) Everyone was so busy and full of robust health during those two weeks they didn't notice that the cells they invaded possessed increasingly sluggish DNA. Soon George and the others were having a difficult time converting the host cell's DNA for the manufacture of Mary viruses.

And then the alarm went out, "The new cells are not operable! The new cells can no longer be organized to produce smallpox."

And then the panic developed, "We'll starve unless we find more cells!"

They foraged in the liver and spleen, traveled the entire arterial and venous routes and even tried the lymphatics. It wasn't easy, moving through blood and lymph fluids, for then they were vulnerable to attacks by

antibodies. But their ranks were swollen by the urgency of their predicament and Mark's antibodies were unable to eliminate all the Mary viruses.

Two weeks after Mark was invaded by Mary he died rendering all of Mary's host cells useless. The bacterial flora from Mark's intestines now migrated to the lymphatics, blood capillaries and veins and finally into body tissue including the respiratory system. The aerobic bacteria used up the available oxygen, allowing the anaerobic bacteria coming mostly from the intestines to begin their proliferation. New forces were now at work; strange enzymes and chemicals appeared which were obnoxious to Mary. The new bacteria which appeared were immune to Mary's enzymes. The world was collapsing; they were on the verge of disaster. Chemical bonds which were unbreakable before, now crumbled before the new enzymes. With no host cells and a toxic environment, the smallpox viruses began to die in hordes. Some even became cannibalistic and attacked each other in their death frenzy.

"The God who was so good has turned on us," said Mary. "This ugliness He has given us must be punishment for some offense we have committed against Him. Surely there must be a reason for this cruelty."

The Mary viruses died seeking some sign from God. "Thank God the smallpox viruses have been destroyed," said George. "I had my doubts about Him, but I guess we atoms cannot comprehend the infinity of God's deeds."

The new enzymes broke George's DNA bonds and liberated him. He eventually mated with four hydrogens to become an odorless, colorless, gaseous methane molecule and floated away from the crumbling smallpox milieu, up through the earth of Mark's grave into the free air.

"Once again a gas? Isn't this a bit redundant?" George thought. The sensuality of his new marriage to the hydrogens was dampened by the memory of his previous experience. George was thankful for his release from the Mary virus but remained leery.

"I'll do God's bidding, but I hope He chooses someone else."

George's methane family, driven by the winds, drifted about the earth, settling occasionally in a coal mine or a pool of stagnant water or some sewage. (Within the time frame of the universe it was a relatively short time.) And finally, at a time unmarked, in a place unknown, lightning flashed at George. The searing heat tore at George's methane bonds and in the presence of a few oxygens, caused a chemical reaction to form free carbon and two water molecules. The odyssey was ended, George was again a free carbon atom.

"Thank God."

(V) Alice loved to play with her Milky Way, her pinwheel-shaped galaxy with its five spiral arms, a flattened disc of two billions stars, gases and cosmic dust. She delighted in displacing the constellation Sagittarius from its center position, a movement which produced resonances within the Milky Way and upset the fine balance of magnetic and electrical forces. This in turn would alter the distance of Sagittarius from the earth's sun, causing sun spots which affected tiny earth so interestingly.

God has been good to Alice.