



*Juha-Petri Tyrkkö*

*Alien's Diary*

## *What if the whole world became different?*

*A young Finnish student of mathematics has to face this question when he, to his surprise, realizes that he has ended up in an alien world. Even the geometry of space is no longer familiar to him. He begins his life anew, as a helpless but with the effective rehabilitation rapidly improving bedpatient, without an explanation for his strange fate.*

*What is humanity in a world where the familiar concept of human being is unknown? This and many other questions ponders the student who has become a unique alien, beginning his rocky path of his new life and seeking his own place in the new world. He makes notes about his experiences, and the notes finally shape into a tale about a journey in the strange world - the alien's diary.*

Juha-Petri Tyrkkö

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The author's translation from the Finnish original work *Muukalaisen päiväkirja*.

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work and feedback!



# 1

My way back to functionality was long and troublesome. It took time before my paralyzed brains even began to realize that outside me there was somebody who wanted to communicate with me. Only then, after a long period of helplessness there was enough of willpower crystallizing inside me that I began to hungrily search signs of regularities from the confusion filling my world. It was my first step out of Chaos; I write the word with a capital letter as a proper name to describe how isolated and formless was the sensory world in whose turmoils I had been drifting without even an ability to estimate how long it had lasted.

I had to begin from scratch. I had to learn to understand my bodily existence from the perceptions that I had finally realized to be touches. I had to learn to organize the visual jumble erupting inside my head into sensible images of sight. I had to learn how to associate the nuances coming in waves, being probably smells, with things I recognize.

My hearing was working and gave me a hint that I was still part of a comprehensible world. Besides the echoes of the room and everyday noises I occasionally heard also speech but was regrettably unable to make out a single word of it.

Little by little, like a newborn, I began to perceive an image of my own shape and how my different parts feeling touches were located to each other. It was not easy as the idea I got was in incessant conflict with how I had learned my body to be shaped.

I was undoubtedly taken care of, as I had no memory of eating consciously or doing any other conscious actions pertaining to my body; my own mostly random motions could hardly have helped me in it, either. I was spoken to, and I was exercised with repetitive sensory stimulations. The persistent repetitions gradually gave me some kind of visual field in which I began to discern directions and outlines and focus my sight to various targets. My viewing was erratic and my perceptions riddled with contradictions, but I could already feel I was making progress when I could tell oversides from undersides and insides from outsides. I also saw colours, but my world of colours was strangely disconnected from everything that I could remember experiencing earlier.

I had no explanation for what had happened to me. From my flickering memory and hallucinatory eruptions of thought I believed I had managed to sift out a reliable memory of living a

normal daily life of a student, and then, all of a sudden, I was here. I did not know how much time had elapsed between that and the current moment. Without the support of my hearing I would surely have first wondered if I were even alive any longer.

After an exercise more troublesome than usual I realized that I was being taught how to swallow. When I began to manage the swallowing without fits of coughing, I was taught how to chew solid food. It could have been some kind of launching speeding my return to the world of perception and motion I had lost. I was left with no mental image of how I was fed before I learned to swallow, but the amount of my available vigour told me that my nutrition had been attended with care.

My tasks were extremely simple and yet very challenging: Look here. Follow with eyes. Extend. Flex. Exert. Reach. To my surprise many of the tasks succeeded better if I did not try to perceive what I was doing but performed by instinct, following the first impulse.

I got words one by one. First nouns. Then a few verbs, too. I could not pronounce them after my teachers yet, but at least I could show that I understood the relationship between the name and the thing. In the midst of all my inability I experienced the delightful exception that since my rising out of Chaos all my memories were clear and reliable, and I did not forget anything that had been taught to me. Regrettably there still was very little to understand.

Were my brains injured? Had I got a life-threatening blow into my head? Had a disease destroyed the functions of my brains? Or was I seeing a nightmare that went on and on without letting me to wake up? Had I lost my mental sanity and sunk among furious hallucinations? Had I been poisoned or drugged? Guessing was useless; I did not get a step closer to a conclusion. And perhaps the finding of the answer was not that urgent, either, as the situation just now was what it was, and I had to adapt to it with the abilities I had.

Gradually I began to feel uneasy with a new notion: the things being taught to me were foreign to me. Had I been a newborn, with my virginal brains I could have accepted whatever was given to me. But my brains were not virginal. When my coaches were away, my mind was flooded with images from my past life. The world of those images was familiar to me. I saw comprehensible shapes and colours, I heard and spoke comprehensible language, I sensed smells that evoked memories from me. Instead, the experiences provided to me now were strange. They did not relate with what had been. Part of my problems I could write off as incomplete regaining of eyesight and sense of touch, but for hearing and smell the explanation did not satisfy me. How can I simulta-



neously remember and forget the language I spoke? Even if my therapists were foreigners, I still should have some idea about at least from what part of the world they came. Why did not the colours I saw connect with any names in my mind, even though I clearly remembered how seeing colours had felt before. Is this how the injury of brains feels? That I cannot be sure even about whether what I see matches with what I remember?

I was lying on a bed. With this I mean that I had a widely extending feeling of weight and touch in a direction which my new experience of gravity told me to be my underside. I had been taught a name related with the feeling. It was a name different from anything I had previously heard, and I understood the name to mean the thing on which I was lying. As the touch was not abrupt, I understood the support to be soft. Therefore I connected the word with my familiar concept of "bed".

On my body there was at least occasionally something that I named "blanket" even though it could as well have been some kind of bedsheet. Now I knew a new name for it, too. When I was alone, I even tried to pronounce the word, but the sounds I produced were still frustratingly far from the pursued example in my memory.

I was in a room. The names for ceiling, floor, and walls had also been introduced to me. Close to me there were a few notable pieces of furniture which I knew by their names but which I did not rush to recognize yet. One of them could have been a table, as it served as a placing and picking area of some other objects. There was also a light source that could be on or off.

Alertness and drowsiness alternated. I was not always sure about which part of what I saw was dreaming and which was wakefulness — as far as any part of it was wakefulness — but finally I got convinced that the most reliable wakefulness were the moments giving me the clearest perceptions. To the past familiar times I returned only in my mind; what I felt I saw with my eyes, dream or not, was always confused and contradictory to some degree. I assumed, for example, to see double images, but as I concentrated on what I viewed, I could not recognize any part of it as a double image.

Then came the first time that I was carefully raised closer to a sitting posture. For a moment I lost again the control of my viewing ability; whether it was because of faintness or of new angle of viewing I cannot tell, but it took a hard mental effort to gain even the sketchy idea of my environment I had had before getting upright.

I still had muscle power even though my arms did not easily move to the directions my mind intended for them. My caretakers, taking turns helping me, encouraged me to try

eating on my own in spite of my weak aim and the food ending up also in wrong places. My hands could hold the cutlery in a wrong way and sometimes I even stuck my cheek with them. My caretakers had been foresighted enough to leave the sharpest utensils out of the assortment.

At those rare occasions that I was called at all, I was called with a word that was not my name. Could it have been some kind of addressing word? I learned nevertheless to answer when addressed, sometimes even with a comprehensible word, though uttering words felt to me like tightrope walking in a gusty gale. Also my caretakers had names, which I learned as time passed. The names were immediately fixed into my memory that had become astonishingly efficient.

My memory was not limited merely into the time after Chaos. When I managed to retrieve past events from the shadows of my mind, like a cow ruminating its cud, the mental images became clear and solid when they were transferred from the "old" memory to the "new" one. Not only my own past experiences became refreshed, but also many things that I had seen, heard, or read in passing, and which I already thought I had completely forgotten: The birthday of the mathematician Richard Bellman was the 26<sup>th</sup> of August 1920, the official language of the island of Maliku is Dhivehi, zebrafish can see the ultraviolet radiation...

This was in a way like travelling abroad. My mind was filled with the vivid, even dazing experiences of past hours and days. Seen through them the life in my home country felt like a distant dream, left behind into the past, and yet my growing and life there formed the whole foundation of my being. There was the source of my culture, language, and most of my convictions through which I understood the world. One's own life and personality will not disappear anywhere even though obscuring wisps of experiences may flit in front of them.

I was, and I firmly believe I still am, Jaakko Vähäläinen, a Finnish citizen. I am 21 years old and single. I was studying applied mathematics in the United University of Helsinki in the hope that I get employed in some institute where theory and practice harmoniously meet each other and where I would get varying and interesting tasks to do. My last memories of my previous life, if you pardon my expression, were from a warm evening of early autumn that I was sitting under the branches of a tree reading a textbook. I cannot remember falling asleep or been in a danger to get a blow to render me unconscious, but that should not be too strange as sleep has stealthily surprised me before, and a blow given from behind could rid its victim even of his life without him knowing about it.

Then, here I was a bedridden patient, confused of my head and without passable ability to speak, without any familiar

connections to anything and with no knowledge about where I was and what had happened to me. With my scanty but luckily quickly expanding vocabulary I believed I had found out that I had been found outdoors incapacitated and brought to my current location for therapy. I could only guess whether I was in a hospital. It was obvious my caretakers were professionals. My eyesight, continuously ailed by perception problems, had not caught apart from my bed any objects that I could have easily related specifically with a hospital.

My therapists had names which were common nouns or adjectives: Handy, Curl, Brisk, Storyteller. Storyteller was a man, the others probably women; their sexual features got occasionally lost from me among their other features. Most of the time I was accompanied by Handy and Curl, while Brisk and Storyteller I had seen only a few times. I believe their names described them well enough. Curl's head was covered with curls that seemed to be endlessly many, and yet her hair did not seem to be in any way excessively abundant or thick.

For the same reasons that I had problems in telling the sex of my therapists I could not tell their nationality, either. Even their skin colour remained somewhat obscure to me as my sense of colour was acting on its own whims, but I believed that at least they were not dark-skinned.

Also the materials of the objects felt strange. I thought I had recognized wood, textile, plastic, and metal, but when I touched or moved the objects with my hand, something in their nature was always different from what I expected by my own experience. The substances could have wrong weight, wrong feeling of warmth, or let out a surprising sound when knocked.

Then came the first time that my therapists, Handy and Curl together, lifted me on my feet besides my bed. My tentative steps were just as erratic and staggering as I could expect. I was not even nearly as weak as I feared, but my familiar viewing problems reappeared on a new level now that I needed to walk relying on my unreliable eyesight. Things became a little bit easier when I closed my eyes, but I also noticed that my sense of direction had disappeared completely: two or three turns on my own, with eyes closed, and my caretakers had to guide me back to my bed.

Unlike a typical bedpatient, I had the benefit that I was reasonably fit and capable of going on with my exercising while my therapists were away. My arm and side got somewhat hurt when I fell down and hit my body against the furniture, but gradually I gained confidence in my ability to focus on my destination, turn towards it, and reach it with careful, short steps.

As soon as I had learned to take care of my basic needs like eating without others helping me, and could somehow stand on

my feet, my caretakers could leave more time for the building of my mental capabilities. They taught me as if I were a young child, to know things by their names. They corrected the errors in my speech. I made rapid progress with the help of my magically strengthened memory, but the world of my concepts was still annoyingly primitive, and whenever the subject was related with perceiving the environment, the confusion and groping began again. Perhaps I really had a brain injury?

As I conquered my inabilities step by step my hope to return back to normal life gradually increased. I guessed it would be difficult for a long while, and I did not know if I would ever recover back to what I had been, but at least I wanted to spend my time somewhere else than in a hospital room. The life outside reminded me also about the matter that I had no idea how the costs of my therapy would be covered. If I in some unexplicable way had ended up into a foreign country, as it seemed to me more and more, would I have any insurance that could help me to cover everything there was to pay? My caretakers did not seem to be in any way concerned about the matter, or perhaps they had just decided that I was not ready to think about the matter yet.

However, sitting on the edge of my bed I decided that I would not give up. Brain injury or not, I would utilize my abilities to the fullest I could manage. I could still learn, deduce, even think mathematically. I had come into a society in which I was an outsider, but while I was waiting for the occasion to return to my home country I would familiarize myself with my new environment until I would know it as well as my five fingers.

I looked at my hand resting on my lap, alternately opening my fingers and clenching them into a fist. I was amused noticing that my hand looked like having nine fingers instead of five. By an impulse evoked by defiance I raised my hand in front of my eyes to challenge my sense of sight.

There were still nine fingers. They were moving each on its own, independent way.

With determination I extended one of my fingers of the other hand and began to touch with it the fingertips, counting them aloud in Finnish language with my clumsy mouth. The fingers already counted I squeezed into a single bunch.

At the fourth finger the floor beneath me finally felt to give in. There was no way that I could evade the truth that grabbed my intestines into its cold fist. There really were nine fingers, in two rows of four, and a thumb besides them. I tumbled down on my bed holding my stomach. My breathing began to turn into gasping.

The sharpest edge of the panic became blunter after a moment, but it did not mean that my peace of mind was

coming back. Chased by my anguish I struggled to get on my feet, stepped in front of the chest of drawers and took from one of the drawers a mirror that my teachers had used for exercising my movements. My fingers that had startled me wrapped around its handle side by side with natural ease. I looked into the mirror. I had seen my mirror image during the therapy before, but I had always written their strangeness off as an illusion caused by my confused sense of sight. Now I had the first occasion and enough time to view my image with attention to its details.

A strange face looked at me from the mirror. I could tell that they belonged to a young man, but my eyes were groping in vain trying to capture from their view the familiar features that I was accustomed to see in my mirror images in my past.

How can I end up in another body, and even without noticing it myself. Actually I had noticed Chaos in a most racking and long-lasting manner, but it did not provide me with any explanation for this unconceivable miracle. Or a disaster, as I was more prone to call it. Loss of one's own body would be hard to even those who had intact brains and familiar number of fingers waiting for them in the new body. Luckily at least my memories were my own. Presumably.

I lifted the hem of my loose clothing and examined my other body members. Perhaps I still could call my body a human body even though the number of fingers had startled me. I still had one head, two arms and two legs, as I became convinced after numerous rounds of careful counting. A kind of feeling of disproportion was annoying me when I was looking at my body even though its proportions seemed harmonious enough for a human being. I had five toes in both feet. Their shape was somehow elongated or flat, but I was ready to accept that after everything else I had already experienced. Between my legs there were male sexual organs of reasonably familiar shape. My navel was in its place in the middle of lightly haired stomach. When I pressed my chest with my hand I felt my ribs. My head was covered with hair reaching my neck. My perception problems came back to my mind when I noticed that it was difficult to understand on what place on my head I had pressed my fingertip. I had earlobes, too, and their shape was familiar enough even though my fingers got lost following their labyrinthine details.

My mouth and teeth felt strange from inside and I occasionally bit my tongue by accident. I could already pronounce words comprehensibly, but speaking required concentration; my tongue felt like it was slipping aside from the correct direction if I did not persistently shepherd it.

It was not a great wonder that my senses were working deficiently if the body through which I sensed was not my own.

Were my brains my own? Had somebody seized me for a monstrous, illegal brain transplant experiment, and contrary to all expectations even had me survive? And from where came this nine-fingered human entity whose body I now occupied?

I put the mirror back into the drawer. I was already pushing the drawer in when my palm pressing the corner of the drawer caught my attention by the touch it felt. The edges and corners pricking my palm did not seem to match in any clear manner my idea of a drawer corner, or even my obscure sight of it. I lowered my palm again and again on the drawer corner, and when I raised it I stared the corner with a sharp eye. I stroked the edges of the drawer with my finger. The drawer was a simple, rectangular object, but it nevertheless seemed to trouble my eyesight much harder than many other, more irregular objects. There was something excessive in its structure. It was too complicated to be a drawer.

I pulled the drawer completely out of the chest and took it in my arms. With effort I got onto my feet and started my way towards my bed slowly, a movement at a time, like a soldier in a parade exercise. I succeeded. The drawer was now resting on the bed and I could sit next to it.

I bent down to examine the drawer corner again, concentrating on its small vertex. The excess felt to push all the way to the vertex everywhere around it. There were too many surfaces, edges, and corners. I set my fingers on the edges one by one. One, two, three. Four.

I withdrew from the drawer to see if I had estimated its shape and structure wrong. I followed its contours with my fingers. Finally I had to believe that the drawer was a simple, rectangular, plain utensil, without any extra stylistic details. I felt its sides through the blanket to obscure away all small disturbing details from my touch. The front side and its edge. The right side. But if it was the right side, what was the other side? Left? But the left side ought to be on the opposite side of the drawer. Next to the right side there must be the front side. The frustration began to emerge again as a constricting pressure in my throat.

There was a pen in the drawer. I took it into my hand. I did not trust my ability to write legible numbers, but I might manage to mark the edges and the corners with dots to find out their number. Regrettably I could not make my calculations match even though I tried several times.

Curl entered the room. I am not sure if I could read her face correctly, but her momentary halt at least showed her to notice with a surprise the drawer on my bed. She noticed also that I was attempting to speak.

"Tell me," she invited and kneeled next to my bed.

I raised my hand in front of me.

"Why do I have nine fingers?" I asked pronouncing with strained attention. The sentence was easy to construct but difficult to utter aloud.

Curl showed her own hand.

"I have nine fingers, too," she said. "Everyone has nine fingers."

It was true, indeed. Curl's hand was similar to mine, except for its more delicate shape.

"Why not five?" I asked. "I can remember five fingers."

Curl's lips curved in a way I recognized to be a smile.

"With five fingers it is difficult to grasp, difficult to squeeze, difficult to work. We need to have nine fingers. You have always had nine fingers."

Luckily there was no table next to me, because I could have slammed my fist on it. Kind and helpful Curl would not have deserved such an answer. So be it then! Let there be nine fingers. Better too many than too few, I suppose.

"Look at this!" I asked and pointed at the drawer. I had riddled all of its corner with small dots. During the last round I had made particularly dark and distinct dots, as if to settle an inevitable mathematical truth.

Curl looked at me with inquiring eyes. I began to set my fingers on the edges of the drawer.

"One. Two. Three. Four. Four directions. Four straight directions."

"Why not?" asked Curl perplexed.

"Why not three?" I replied for a challenge. "A rectangular box has three straight directions."

"There must be four of them," protested Curl.

"From where come the four directions?" I demanded.

Curl gave me no direct answer but raised me on my feet next to the bed. She grasped my arms and lifted my right arm forward.

"Forward," she said. I kept suspending my raised arm to cooperate.

Curl turned my left arm backwards. She compromised over its straightness to maintain my comfort but she clarified the direction to me anyway at least with the precision of right angles.

"Backward", she said. After a moment she turned my arms into new directions.

"Up", she said after raising my right arm and began to lower my left arm. "Down."

After that she began to spread my arms sideways. My head spun a little when I tried to follow the direction into which my arms extended. Curl said two words which immediately brought to my mind the anxiety I had felt trying to understand directions. For some reason the feeling hit me only now, at the

third position of my arms.

Curl had not finished her presentation yet. She turned my arms into yet another position — and said again two other words that had frustrated me.

”Do it once again.” I asked.

Curl repeated the movements. Front and back. Up and down. Sideways. Where? Had I pushed the concepts away from my mind as too difficult and let myself believe that I can manage without them?

And after them again two more words.

Seeing my puzzled expression Curl touched with her palms the tip of my nose and my neck.

”Front and back,” she said and moved her hands under my chin and to the top of my head. ”Up and down.”

Then she moved her hands to my temples. I felt her thumbs against the edges of my earlobes. She said again two familiar words. They must undoubtedly be ”right” and ”left”. Now I could even guess which was which.

Then her hands moved once again, far away from my ears.

But they were still on my temples. My other temples.

Curl said the two last direction words, and I did not have any idea how I should have called them. My legs began to shake a little when I felt her touch on my head, at locations that in principle should not have existed at all.

”Do you understand now?” she asked. ”Four directions.”

”I have four directions?”

”There are four directions everywhere.”

”Straight directions?”

Curl set her arm perpendicularly against her other arm. Then she put her finger on an edge of the drawer and traced the edge over the corner onto another edge. She taught me the word for ”right angle”.

”There are four directions in right angles everywhere?” I still asked.

Curl nodded. I looked at my bed. Its edges were very soft, but there were four of them meeting at the corners.

Likewise there were four edges of the walls coming to a corner of the ceiling. There were four perpendicular directions in the world.

There were four dimensions in the world.

Perhaps I wept a little, as Curl swept a droplet of moisture off from my cheek. In a way her reply was an explanation to many things that had been bothering me, but on the other hand it felt like a final defeat. I had struggled with clenched teeth to overcome my strange lot, but now I had been grabbed by an adversary against whom I had no chance. Chaos was coming back, and this time it was not confusing my senses, but flushed away the foundation beneath my sense of



reality.

"Do you want to get outdoors for a while?" suggested Curl to cheer me up.

I nodded, realizing only remotely what I was asked, as the center of my consciousness was occupied by the scorching understanding that I was no longer a part of the world I had known.

Curl led me carefully by my arm to the door and the corridor beginning behind it. As soon as I got the sight of the corridor I remembered that since my exit from Chaos I had never been outside the room, except for the booth in which I satisfied the necessities of my bodily maintenance. Now I saw the straight, light-coloured corridor beyond the door for the first time. The geometric truth I had just learned was now drilled down deeper and deeper into my consciousness as I looked at the meeting edges of the ceiling and walls of the corridors, the rims surrounded by the edges, the wall and ceiling surfaces surrounded by the rims. The three-dimensional surfaces. The three-dimensional *flat* surfaces. And the four-dimensional interior space of the corridor, surrounded by the surfaces. I still could not brag with mental mastery of what I saw, but between Curl's presentation and what I saw there seemed to be an undeniable logical correspondence.

On the side doors of the corridor there were symbols. They might have been the script of these alien people. It was illegible to me and I had no recollection of seeing it ever in my life. The strokes of the symbols were bending in different directions, using all the three dimensions that the surface of the door allowed to them.

Curl opened the unmarked end door of the corridor. As the door began to open, a light brighter than the corridor light, and also fuller and more illuminating, began to flood inside. I wanted to call the light "whiter" even though I did not trust my ability to recognize colours. The light had, however, a convincing appearance of daylight. The door opened all the way and touching my arm Curl led me out through it.

Has a firework rocket ever exploded on your face? That was how I felt when I stepped outside onto the front yard and saw what there was around me. I mean especially what there was on the sky. The light I had called daylight was not sunlight in the sense I was accustomed to use the word. The sky was full of sparkling celestial bodies, like small jewels, against the background gleaming in silvery shades. The celestial bodies were not dazzlingly bright, but their enormous, world-filling plenitude erupted into my head with a force that affected me like a kick of a horse. I fell first on my knees and then to sitting posture, squeezing my head with my hands, and in spite of that I almost immediately felt compelled to turn my eyes back up,

to drink in the sight whose absoluteness crushed me, but whose message nevertheless did not let me turn my back to it. The sight was beautiful, exceedingly beautiful, and also painful as it convinced me that the people here would not even in theory know anything about the world which had given birth to my memories and my life story.

"Please forgive me," said Curl kneeling next to me. "I did not know."

"Do not worry," I soothed her. "Let us look at this."

And we looked together at the sky which due to its new dimension opened into unbelievable expanse, with the unnamed celestial bodies slowly drifting along its canopy.

## 2

To my relief it appeared that I did not have any brain injury after all. My perception problems have been of functional kind: I had four-dimensional eyes and four-dimensional brains seeing with them, but behind the four-dimensional brain layers there were hiding my old habits. Relying on them I forcibly tried to interpret from three-dimensional basis everything I saw, or if the task became too hard, gave up the interpreting altogether, without even noticing myself doing so. Certainly it was a kind of injury, too, as it hindered my adapting to my environment, but I hoped that it could be overcome easier than a brain injury. I was a fish whose challenge was to learn to walk on the dry land. Greetings from Abbott's Square to all the spheres of the world!

I naturally had a reason to be grateful that I got such a human appearance. I could as well have ended up into the knotted depths of some hyperspace, occupying the body of a multitentacled oddity using radiation for its nutrition. Even the culture around me was human culture. However, I could already guess that much fewer things could be taken here granted than in my home world.

A human being conceives his environment from the basis of his own self. Here people were different and therefore so were the concepts. With the fourth dimension I had also gained a new sideways direction for which I did not have any other name than what I learned here. I also got a number of bodily features that I could have only by virtue of my body being four-dimensional.

Even three-dimensional directions are not independent in their definitions. We human beings use the words "forward" and "backward" because we move towards our destination, and "up" and "down" because we are subjects to gravity. Even a tree knows where are "up" and "down" because it has a top and roots, but if we ask from a tree which way is "forward", we will get no answer as to a tree all the horizontal directions are "sideways".

Therefore it was easy also for me to perceive even in a four-dimensional world where were "forward" or "up", but to describe lateral directions "left" and "right" were no longer sufficient. There was not mathematical law, either, that would dictate which opposite pair of lateral directions would be called "left" and "right"; the relationship was rather within language and anatomy than within mathematics. The left and right hand

have been named by their difference of dexterity, as most of the people in my native environment were right-handed. In this world, too, I shared a dominant hand with the majority of the society. As the older layers of my mind claimed the side of this hand to be called "right", so I could connect the words "right" and "left" with the directions in which my four-dimensional body had shoulders and arms. For the other lateral direction, different but in many ways equal, I had no Finnish names, unless I would make them myself. In the local language the directions were similarly named from the basis of human body, by liveliness and stillness, as the vital functions occurring inside the chest were easiest to detect from a certain side of the chest, perpendicularly to the shoulder line.

I mention the lateral directions as if there were only four of them, but as the compasses familiar to me from my past had between their cardinal directions endlessly divisible intercardinal directions, finally integrating into a smooth circle of 360 degrees, so had also the lateral directions of my new existence between them endlessly divisible "intercardinal" lateral directions which similarly could form a smooth circle of lateral directions, with its every direction perpendicular to both forward-backward and vertical directions. If the axis of forward-backward is included, with all of the new intercardinal directions brought forth by their inclusion, they supplement the lateral direction circle into a sphere of all horizontal directions.

My therapists had done good work. I had recovered quite capable, beyond anything I could expect in the beginning. I still had a long way to reach fluency in my life, and my errors had already taught me to not think too much of myself. Even though I already could walk and talk and could imagine myself doing even simple work, my adaptation program was not over yet. The therapists gradually withdrew making room for teachers who took care of adding to my knowledge. Besides my education the teachers also gave special education to some children needing it, some because of their subnormal abilities, some others because of special talents. There clearly were not many children to teach as the teachers had time to give me private education. I still did not know who paid all this work, and I did not know how to ask it with the intended meaning, either.

Because I, too, conceived my environment from the basis of my own self, I began my introduction to it from my own body. I walked on the walkway of the park and examined my ability to maintain my balance on two or even one foot, even though I had many new directions into which to fall. I managed even to run a little. I felt how I got out of breath, how my lungs panted inside my chest formed by a large number of ribs but nevertheless light in weight. I stood on my head next to a wall

trying how the blood packs into my head. I tested my limits of exertion by lifting heavy objects from ground. I talked, shouted, and sung. I swung my arms and let their four-dimensional movements gradually seep into my mind. I intertwined my fingers into most imaginative arrangements.

My diurnal rhythm was one of my strangest bodily experiences. Earlier I was in the habit of staying awake when sun shone and sleeping in the darkness of the night just like the other people I knew. However, in my new environment there were neither sun to dominate the sky nor the darkness of night. The canopy of sky rotated slowly, and while the sparkling lights disappeared beyond the horizon, new ones rose elsewhere to replace them. The scenery was bathing in a continuous, soft, indirect daylight. I had to rest when my body needed it rather than when a sun set.

My rest was not sleeping in the sense I was accustomed to understand the word. In this world I, like the other people, had different modes of vigour, and thereby different periods of activity during which we used the most plentiful forms of our energy and gathered more of those forms we were lacking. Sometimes we could lie still a good while, our bodies limp as rags but nevertheless for example discussing with each other. Other times our bodies could be awake and possibly perform some simple task with repetitive motions while our brains were filled with silvery haze, barely conscious of the surrounding world, wisps of thought adrift. While we were alert also the emphasis of our alertness could change, but if the need arose we could wake all parts of our our bodies and minds into full functionality.

There were small differences in the proportions of my body compared with my earlier three-dimensional body. In the four-dimensional world the volume is a quantity of fourth power, and this fact was manifest also in my body structure which I had gradually learned to know both by myself and under the guidance of my teachers. My stomach was larger in diameter than before as it had to serve the proportionally larger bodily volume surrounding it. On the other hand my esophagus on the midline of my body was not as much wider as my body mass led me to expect. Even though tranquil dining on its conditions was a pleasing experience, bolting a meal down in haste could be more troublesome than before. It could easily weaken the popularity of fast food among these people.

My digestive system, especially its secreting organs like liver or pancreas differed somewhat from what I had earlier had, but in its general features my digestion felt similar by function and by speed to what it had been before.

My heart was proportionally larger by its diameter for the same reasons as the stomach. It had a similar muscular apex as

a three-dimensional heart, but the apex did not extend left but "liveward" where space for it was available more easily. Therefore also the heartbeat was easier to feel from the live side of the chest.

The bones of my limbs were slightly thicker than before and the muscle layers slightly thinner than before, but as the muscles were closer to the body surface, they could easily form a sufficient mass even as a thinner layer.

My mouth, as said, felt strange in the beginning, but this was due to a new measure the fourth dimension had brought into it. My brains, accustomed to controlling a three-dimensional tongue, were not immediately ready to utilize the four-dimensional properties of my mouth. In the spoken language I had learned there were a few sounds whose practicing woke up my dormant muscle groups and introduced me better to my vocal organs.

The written language was a specialty of its own. In the four-dimensional world text is written on the three-dimensional surface of a sheet. As single characters can come in many different shapes and have plenty of expressiveness as they extend into the many directions allowed by the three-dimensional surface, the characters are used to express a whole word instead of a sound, similarly to Chinese language, but here the appearance of the characters was simpler. The characters formed lines, which formed line sets, and the line sets were stacked one on another until the page became filled with text. It was possible to write the contents of a complete novel on a single page, and therefore "book" meant here a single sheet.

I was afraid that the learning of a large number of characters would become a life-long task, but there I was completely wrong. My wonderful memory, for which I probably have to thank the four-dimensional fine structure of my brains, engaged in work and recorded every character as soon as I had understood them. For a few periods of alertness I was satisfied with learning a new character now and then when I encountered them reading texts, but then I got bored with my slow progress and sat down to read a table, decided to put some speed into my learning. Handy who was free of urgent duties at the moment sat next to me to explain the use of the characters as actual dictionaries were not available, and to my surprise I had memorized almost all of the about then thousand characters in the table before I began to feel torpid. I did not actually manage to learn even nearly all of the characters by their meanings, and even Handy encountered a few characters she could not recognize, but now I knew how to read the characters, and as I would learn new spoken words later, I could also write them.

My teachers had told me to write notes as soon as my

motoric skills allowed me to do so. Making notes about my problems and things already understood indeed helped me to analyze what I have learned. I began in Finnish language, but as I learned, I soon began to use the local language, too. My notes developed into a diary describing my learning.

Brisk got an idea that my fine motoric abilities would improve if I exercised them by drawing. She brought me a bundle of sheets whose material I call paper, inspired by how it feels to my touch. Next to the sheets she put a small container of dye and a collection of drawing tools. Now I would draw shapes; the colours would have their turn later. As I grabbed the tools with visible eagerness, Brisk left me to my task. However, the task did not proceed from its start for a while, as I encountered a new geometric surprise.

The tip of a four-dimensional pencil is, similarly to a three-dimensional one, point-like. In three-dimensional world sketching often begins by drawing outlines with the point-like pencil tip. Now my field of vision and the objects in it were three-dimensional, as seen without the dimension of depth. That meant that the boundaries of the objects were two-dimensional. Should I draw the outlines of the objects as if I were drawing the shading? And what would happen when it would be time to fill the interior surrounded by the boundaries? The work threatened to go on into eternity, and I even wondered if I had enough dye to finish the work.

My memory came to rescue again, as I had seen a sketch earlier. Four-dimensional artists naturally did not try to begin by drawing the whole outline of their subject but only its key areas, and even those only to the necessary degree. As a result there would appear only a few scattered small features on the paper, but if the work was skilfully done, they would form a clear cue about how the work would look finished, if the sketch were viewed from a more distant position. When it would be time to create the final contents to the image, the rest of the tools would take up their duty. Besides pencils and brushes the tool set of an artist included a number of different styli, spatulae, and other tools whose naming required creative imagination. In spite of the geometric challenges it was possible to draw an image as quickly and with as good likeness as in three dimensions. There were genres of art where large areas could also be filled with reference textures that had been originally borrowed to the world of art from technical diagrams.

I do not claim that I have been a masterly drawer earlier, either, but this time I had to strain myself seriously to get the proportions and contours under my control. I would have liked to strew the room full of eyes to get a full and reliable conception about the subject of my drawing, a largish, flat, and

wrinkled food plant. I managed to complete the image eventually. Even though the image was rather sketch-like even finished, I believed at least the largest features match with the model. Seeing the result Brisk looked accepting but did not give further comment about the artistic quality of the work. She pointed some details in the picture to show where she would like the picture to be improved to make the shape of the subject more obvious to the spectator.

Besides drawing I also learned to cut a three-dimensional, ball-shaped piece out of a sheet of paper using a flex blade. Balls can be cut also with a spherical die, if the die happens to be of desired size, but craftsmanship is always craftsmanship.

Even though I used to think balls as three-dimensional objects that time, I soon realized that if I want to name things in Finnish language, I have to be more consistent in the way I put my words. There was a large hole in my vocabulary, and it needed to be supplied full. I had a severe lack of names for four-dimensional shapes and things specific to four-dimensional world. The names of four-dimensional things I brought here with me were in the jargon of mathematicians. If Finns came here in great numbers, I do not believe that they would want to play footherball or drop into their drinking glasses any ice tesseract, not to mention octachora. For people here the names of four-dimensional shapes and objects belong to the simplest kind of normal language, and the natural use of language demands that they are so for me, too. Therefore I must call the four-dimensional hyperball simply a ball, because it is used for the same purposes as ball was used in my past. A surface is a surface even if it has three dimensions. However, this results in the lower-dimensional shapes being left without any names at all, and from that trap even Greek or Latin will not release me. If the thing I cut out of the paper is not a ball, then what is it?

A three-dimensional ball, as drawn on a paper, is a closed surface only within the surface of the paper. To the fourth dimension it is open and hollow. Just like the tip of a three-dimensional pen can penetrate through a paper in the middle of a circle without touching the perimeter of the circle, it is similarly possible to punch through the center of a three-dimensional ball with a four-dimensional pen without touching its spherical surface. In this world a three-dimensional sphere winds around its interior but does not shut it out from its environment. This was the idea by which these people named the three-dimensional sphere, and following the same idea I decided to rename the sphere as a *windle*. Filled windles could be called by a familiar analogy spots or disks, as I saw there no significant risk of confusion. The same shape cut out from a flat sheet, like paper, could be called for example windular plate,



when specifying is necessary.

For objects with angles and edges a new name was necessary for the entities which were surrounded by the edges and who on their turn surrounded a single surface. I could call them rims.

"Cube" is a more painful case, as its name in my mother tongue annoyingly contains the numeral "six", and the rectangular bodies of this world that I would have liked to call cubes had eight surfaces containing their interior.

I knew that the problems of language would repeat later that I would be finding names for regular utensils, and relying on the concepts of my previous world would cause other problems, too. Luckily I had guides who understood my problems, at least from a technical viewpoint, even if they were not especially eager to adopt the thought of my three-dimensional origin; about that subject I had remained quiet except for my anguish with the drawer that Curl had arrived to witness.

My teacher Lucky was wandering with me talking about all kinds of things coming to our minds; I called this man, appearing senior to me, a teacher, even though he was not assigned to my company with such a title. I learned a lot from him. His specialties were closer to mine than those of the others, and I felt scholarly kinship with him. We had turned off from the park path among low-growing grass; I say "grass" because that is how the plants appeared to my eye. Further away there was a road with vehicles moving along it. The vehicles had eight wheels and were designed to transport small groups of people, so I liked to call them cars. The traffic was almost soundless, partly because of the technology of the cars, partly because in four-dimensional world sound had more directions to disperse into open space and therefore distance attenuated sounds effectively.

I got information about the celestial body on which we lived, and about other such bodies, too. I am not using the word "planet", as such a word has no use in this world where celestial bodies cannot orbit around each other. I had begun my inquiries about the lights shining on the sky, believing them to be stars. The name I got for them revealed nothing to me, but I nevertheless bravely connected the word in my mind with my native word for "star". I had been frustrated as I could not form a description for the concept of solar system to ask more. However, my opening of the discussion led my teacher to remind me about things that I ought to have known even without reminding due to my university studies.

"Celestial bodies cannot orbit around each other at all, then?" I asked my teacher a stupid but useful question.

"No, they cannot," he replied. "A spacecraft can orbit

around a body even for a long time if its pilot monitors and when necessary adjusts its motion, but celestial bodies are without a life or will of their own. Their fate is soon to either fall into the center or escape into distance.

This much could perhaps even Newton have told me. In three-dimensional space there are stable orbits, in four-dimensional there are none.

"If a long, thread-like object attracted particles, the particles could possibly travel sidewise around the thread along a stable orbit for a while," added Lucky as an afterthought.

"And all those stars go on traveling each to its own direction?"

"All of the celestial bodies are in motion. Their configurations will not repeat."

"Will they collide?"

"It is possible but very rare. So far we have seen traces of only one collision, and we are not completely sure even about them."

The thought about wandering celestial bodies was actually quite cosy. There were so many stars that life was possible also elsewhere than in the vicinity of single stars.

"Do we ever come too far away or too close to a star?"

"It can happen more often. Usually our environment compensates effectively the changes in the heat we receive, but hot passages can happen. The life must escape underground or regenerate from heat-resistant germs."

"If there were such a large star on the sky that most of the natural light came from it, it would be easier to follow the passage of time by its movement. When I look at the sky here, it tells me nothing about what time it is."

Lucky looked preplexed.

"You do know how to read a clock."

"But there have not always been clocks?"

"Not always, but long since. And reading the time from a celestial body on the sky could result in a very complex calculation."

"Why?"

"Angles are difficult to evaluate with unassisted eye, and conversion to time units is complicated. A glance at the sky would give only very approximate information about time."

More than Lucky's verbal reply I got interested about the messy jumble that he traced in air with his fingertip. Was that how an imaginary sun would move on the sky here?

Lucky's explanation might tell also why I had never seen here a clock with hands rotating on a round face. The clocks had merely a continuously increasing number, like a car odometer. Here there were no cyclic movements involved with the sense of time, and the rhythm of life did not even imply

adherence to round numbers, except within certain societies who might agree so for their own purposes.

"What was that curve that you drew into air?" I wondered. "I thought that celestial bodies would move along circular arcs over the sky."

"Not circular arcs but skein curves. Rotating movement consists of two components, and circle can describe only one of the components."

"Two components?"

Lucky raised his fist into air next to his head. First he tilted his fist sideways from the wrist so that his knuckles, originally pointing upwards, turned alternately right and left.

"This is one component," he explained.

Then he turned his fist horizontally so that its front side turned alternately to live and still sides.

"This is the other component. All natural rotating movements can be divided in one way or other into two perpendicular components. A single-component rotation is an artificial special case where the speed of the other component is zero."

To emphasize his words he made now the two rotating movements of his fist simultaneously. I had to believe it now that I saw it with my own eyes, even though my confidence in my own eyesight had been off for quite a long time.

In three-dimensional world there are only single-component rotations. If a rotation is added with another rotation, they blend together into a new single rotation whose axis is in a new orientation. Four-dimensional rotation has two components which can occur and change without essentially interfering with each other.

Therefore a rotating four-dimensional body did not have an immobile axis, because all of its surface was in motion; only the center point inside its mass remained stationary. Similarly the canopy of sky underwent a double or two-component rotation and the stars on it were not tracing circular arcs but irregular squiggles resembling Lissajous curves. My teacher called such irregular curves "skein curves". If there were a sun here, it would rise and set here and there at whatever time.

No wonder that even the world map had looked so strange to me. Our celestial body had no poles, but two perpendicularly oriented pole circles, named "slow" and "fast"; they were poles and equators unto each other. There was neither arctic nor tropical region; the climate was quite similar everywhere and all the time, pleasingly mild. The climate types were mostly affected by the vicinity of an ocean and the altitude of the terrain.

"Have you ever thought how it would be to live on a three-dimensional celestial body?" I asked urged by a whim.

"No," replied Lucky. "Quite flat, I suppose. It is difficult to imagine, as in a three-dimensional space there can be no matter and therefore no life, either."

Thus it was easily shown that my youth with its university studies were a theoretical impossibility. Would it be better if I instead of my life story told him that I had formerly been a flying cow? Neither of us would even need to consider delivering me into therapy, as I was there already.

"Three-dimensional geometry seems to be your favourite topic," noticed Lucky smiling a little. "And why not, it is involved with many interesting mathematical rules."

How could it not be my favourite topic as my brains had born and grown into it? Perhaps these new brains of mine have on the contrary got many four-dimensional abilities from this world, whatever way they may have ended up as the dwelling of my three-dimensional consciousness.

If I could not tell from where I came, I could at least bring something new and different into this world. One such pleasing occasion came when Handy and Curl were free from their work at the same time. I had assembled together a playing gear that I could use to teach them a game resembling tennis. The rackets were made of windle-shaped disks of plant fiber board attached to handles sufficiently easy to grasp. Handy helped me in the attaching work. To substitute the net she spanned a rope between trees. I thought first to ask them to serve the ball over the rope, but when I walked on the court improvised between the trees I noticed that a single rope is not enough to divide the court into two halves in a comprehensible manner. It is better to divide a four-dimensional court with several ropes spanned from left to right as seen from one end of the court, with the ropes paralleling each other from live to still. These ropes and the imaginary surface between them and the ground formed the "net" dividing the court.

The local people knew various athletic games, but tennis seemed to be a new kind of experience to them. Curl practised serving with me and Handy leaned against the trees next to the court laughing hilariously at the sight. Our ball, made of plant-based substances and coagulated into its elastic shape, did not become as good as I hoped, as I had to yield to the laws of physics and made some compromises between size and weight: the ball was almost as large as a small head of cabbage.

I also introduced my companions to a spin serve, but Curl suggested a change to the rules allowing two racket contacts per serve to include both rotation components into the spin.

We experimented with kicking a ball, but for a soccer match we would need two teams, and we would also need to reconsider the number and roles of the team members.

Handy had a string instrument which demonstrated me the

value of having nine fingers when I tried to pluck it. The instrument was held on the player's lap and played with free strings like a harp. With a vivid Finnish imagination it was possible to hear some *kantele*-like nuances in its sound. I learned to play *Maamme*, my national anthem, with it. The Säkkijärvi polka I decided to leave for the time that my dexterity and skills in playing would improve.

I picked out some local tunes, too. The basic elements of music, like chords and scales are surprisingly similar, at least for a part, in both worlds, but how could they not be? The sounds worked in four dimensions about on same conditions as in three, and the ratios of integer numbers which gave birth to harmonies were similar in all kinds of worlds.

Hearing had from the beginning been my only sense that was working the same way before, during, and after Chaos. My other senses had been overwhelmed not only by the four-dimensional viewpoint, but also by certain fundamental differences between the structures of the worlds.

Lucky had told me that three-dimensional world cannot contain matter. Perhaps it could not, not the kind of matter that they knew. Similarly the matter familiar to me probably could not have any better chances to survive here where even the geometry supporting its existence was foreign to it. The air I was breathing was not air in the sense I have learned in my previous world, and the dominant liquid in my body was not water. They did not even consist of similar basic particles than the matter I know previously.

In the human scale this world was very similar to the one I lost beyond Chaos, but in the cosmic and atomic scales they did not have much in common. They were like images of a face on computer screen and printed on a paper. Both represented the same recording of the same person, but seen through a microscope one was composed of semiconductor slabs glowing with red, green, and blue lights, while the other was a thicket of cellulose fibers covered with inks. Perhaps humanity could similarly get a similar appearance on two completely different foundations.

Or perhaps not completely different. Here, too, matter was consisting of atoms, as far as the word "atom" is used in its original sense to mean indivisible basic particle. Protons and electrons I had obviously better to forget here altogether. I had returned to an era where the structure of the atom was still unknown. Its other properties, on the other hand, were known quite well, and they could be effectively utilized, too.

There was chemistry here, as the substances became bound to each other according to their nature, some of them eagerly, some of them reluctantly. The number of bonds between them affected their geometry, which defined the structures they were

able to form. The same mathematical conditions that grouped atoms to alkali metals, oxygen group, or noble gases, affected the qualities and states of substances here, too. The substances maintaining life had reserved the best of the best for their use also in this world. Carbon, the Jack-of-all-trades among the atoms, had an equivalent in this world, and as could be expected, it was showing its versatility by forming the skeletal structures of life. Perhaps it was not as black as the carbon I had known, but like its three-dimensional cousin it was incomparable among the atoms in forming chemical compounds. Oxygen had a local equivalent, too, and that was what I was breathing here. There was water here, as well in oceans as in living bodies. There were substances that looked and felt like metals, but matching them with three-dimensional counterparts was not as easy as with non-metals.

The absence of electrons resulted in significant differences in how energy worked, as the energy formerly familiar to me was largely interaction between electrons and light or heat. It had been proven that there was light here, as I had eyes that could see. However, the light I saw here was not the same electromagnetic phenomenon that I had learned to know earlier. The electromagnetic fields I knew consisted of an electric and a magnetic component, as the name revealed, perpendicular to each other and to the direction of its progress. These three entities formed a triplet which used the three-dimensional space as its framework. But what if there were one dimension too much? What is the definition for a force field having no ready-made solution for its orientation? Could it be formed simultaneously into all available directions, and what would it be like in such case?

Magnetism does not exist here, at least not in any practical scale, but radiation exists. There is a force resembling electricity. It is transmitted as radiation, and there are cables that can be used to conduct it. It forms charges and it attracts and repels. It can be used to create heat. It even produces some kind of sparks. It will create no magnetic fields, so it is not applicable for magnetism-based machines. Electric motors must be designed here by principles independent of magnetism, and radio transmissions are not possible with equipment similar to that in my previous world.

There was also another kind of energy and radiation, which I call inspired by its local name as triplet force. Besides its direction of progress it has three components making its behaviour quite complex. Triplet force is capable of many things that its above-mentioned little brother is not. Besides charge, voltage, and current it has as its properties orientation, handedness, and some others, which must be correctly configured, if one wants to utilize its capabilities to the fullest.

Quite many of the machines used in energy transfer exist to control and modify the properties of triplet force.

Natural light is a short-waved mixture of these two forces. My eyes can discern different wavelengths from the former, and also the handedness from the latter. From these contributing factors my visual nerves conjured up a vast and varied assortment of colours which were very difficult to compare the electromagnetic colours of my former world. For the new colour experiences I had only local names. I tried to make Finnish names for the colours a few times, but I run out of energy every time. When this multitude of colours flooded my visual cells for the first time after Chaos, I already thought I had lost my sense of colour and was seeing illusions, but in reality I had merely been unprepared to handle all the colours and nuances I saw.

Certain mechanical things worked in the familiar way. Matter had mass and inertia: when I lifted, say, a piece of trunk from ground to hurl it further away, I knew it to be heavy and to resist my attempt to send it flying. Substances had each their own durability and they broke when their limits were exceeded. Surprises happened only in special cases, for example when I failed to estimate correctly the load that a three-dimensional cross section of an oblong object could withstand.

It took some time before I could get used to the ways objects rotated. Balls, as I mentioned, rotated in a twofold way: while they rolled forward they could also spin horizontally like a top. Hitting an obstacle they could then bounce sideways in a surprising manner. It was possible to limit the rotation of wheels by fixing them to shafts that allowed them to rotate along a single plane only.

When I pondered matters pertaining to physics, I noticed that coming through Chaos I had lost my familiar measuring system. Here in my new world there was nothing that I could use to anchor my measuring units. The old natural laws were no longer in effect, and comparisons were no longer possible.

How tall was I? Formerly I could have said that I was not in the scale of millimeters as drops of water would have been as large as I. I could not have been in the the scale of kilometers, either, as I would have been crushed by my own weight. Would the same happen here? How long would a meter be in my eyes now? How long would a second last? How heavy would a kilogram feel?

I had, of course, the local measuring system which I had already learned to use to some degree. My brains had only emptiness to grasp when they occasionally felt the instinctive urge for a unit conversion that was not available. Should I create myself an own, personal system of units?

Let us see. I had been 176 centimeters tall. Perhaps I could

now think myself to be equally tall, as I did not feel myself to be particularly tall or short, and I was also of average stature compared with the other people. How much would I weigh? If I chose my old weight, 70 kilograms, would one kilogram be a suitable unit for my life? A kilogram had formerly been the weight of one liter of water. If I now chose "liter" to mean a rectangular volume with the edge length of 10 centimeters, and "water" to mean the liquid in oceans and in my body, my weight would be nearly 200 kilograms. On the other hand, now I also had more muscular mass to support my weight. I did not feel myself to be particularly heavy, and accordingly the liter of water inside the volume felt lighter to me than a liter before Chaos. Perhaps I had better then to keep my familiar height and familiar meter, and accept as its companion the lighter kilogram?

While I was playing with the numbers I also noticed that three-dimensional and four-dimensional volumes ought not to be compared haphazardly, as the results would depend on the chosen unit. Had I evaluated my weight based on a measure of one centimeter and one gram, my weight would have been nearly 2000 kilograms. However, the four-dimensional liter was such a convenient and bodily well-matched unit that I decided at all costs to choose it as my means for weighing.

When I created in my mind a time unit that felt like a second, I found out I could stay mentally alert perhaps ten or even twelve hours for this time, and after that a few more hours bodily active. Then my diurnal rhythm would be surprisingly close to what it was before Chaos, seen from my own viewpoint. Whether my sense of time was even close to that of my native world or if there was even a theoretic proportionality between them I could not tell, but for the time being it was sufficient for me to know that when I came to the state of alertness, I had about one workday's worth of time for my intended tasks before I had to rest or change my mode of activity.

Now that I had decided that I am 176 centimeters tall I could also convert the geographical distances I have learned here into my own units. After a quick mental calculation I found out that in spite of its familiar gravity this celestial body was surprisingly small, a little bit over 4000 kilometers by its diameter, which is only slightly greater than Moon of Earth. However, the number was quite deceptive for an inhabitant of Earth as this world was everything but small! Because of its four dimensions it had space on its surface one third of a million times that of Earth if a cubic meter is matched with a square meter, or 330 times that of Earth if a cubic kilometer is matched with a square kilometer. The number is even higher because a smaller portion of its surface is covered by oceans.



There were plenty of people all over its surface, which was mostly habitable, and so its population was staggering 20 billion, that is 20 million million people, without any place suffering of excessive crowdedness. I could hardly wait to see one of its metropolises, which I had heard to exist here, too.

None of the cities was to my knowledge a capital city, and I had not heard anybody to mention a word that I could understand to mean a country. I would have to introduce myself with the society system sooner or later if I were to join it as a citizen with rights and duties.

### 3

I got a dwelling. Because of the peculiar characteristics of the local economy I was for a while uncertain of whether I got it on credit or as an allowance, but I and my helpers agreed in our idea that I were to contribute to the society with my work.

The dwelling I got from the distributing organization had two rooms. It was spacious enough for both me and one or two temporary guests, or a life companion: couples and families were the building blocks of society here, too. The floor area of my dwelling, 45 of my self-defined cubic meters, felt to be quite much when thought as numbers, and it was much in many ways. However, the proportions of my four-dimensional dwelling caused me again some surprises.

In four-dimensional building largeness and smallness are in strangely conflicting manner present simultaneously. The larger room of my home had with its 27 cubic meters a similar amount of floor space as some of the largish, over five-meter-wide living rooms of my native world, but here the walls were not more than three meters apart. It was nevertheless possible to furnish the room with with a similar amount of furniture as a large three-dimensional living room, provided that the furniture is not placed completely blindly. Four-dimensional people respected the use value of the central part of the floor, because the portion of the central part compared to the periphery was small and instead of four sides there were six sides of the room competing for its services. Couch potatoes undoubtedly liked the living solution as they could reach most objects in the room from the center of the floor almost without taking any steps, and even lolling next to a wall they still had much more within arm's reach than in a world with one dimension less.

My home was not fully furnished but not empty, either, as Handy and Curl had wanted to take care that I had everything necessary to begin my self-sustained life. The living room had a seat resembling sofa, two tables and a few lightly constructed backless seats. In the corner there stood a delicately built entity nearly touching the ceiling. A number of slender, grasslike branches were extending from it, arching downwards under their own weight and ending into a decorative tuft. The thing was not growing out from a flower pot but stood on the floor on its own feet, but as it did not walk, I supposed it was a plant. I was supposed to give it water and nutrients from a cup of the size of a table-tennis ball now and then. Driven by some kind of reflex it slurped the cup empty in a minute or two.

On the table corner there was a simple device, as large as two palms, which served as a telephone by transmitting private discussions and as a radio by receiving public broadcasts. Mobile phones were not known here, so I had to satisfy with this device connected with a cable to a wall socket. There was no television set, either: the transmission of moving image was known but the technology was not applied on public communication. Also computers did not exist in a form familiar to me. Some kinds of calculating devices were available, but for reproduction of music, image viewing, communication, and for archive maintenance there were separate, dedicated machines. I wondered whether my name would end up in history — praised, cursed, or both — if some time in the future I managed to reinvent the laptop computer in this world.

There was a small set of shelves in the room. I do not call it a bookcase, as the books, each consisting of a single sheet, were stored in a book box, which was just one of the items kept on the shelves. The rest of the shelf capacity was left for utensils and decorative items.

The other room of my home was, as one can easily guess, a bedroom with appropriate equipment. Besides the two rooms there were also cooking and sanitary units, separate from other rooms for the same reasons as in the three-dimensional world. Cold water came in through a pipe, was heated to the desired temperature at the moment of use, and let into the regional sewerage after use. I did not know if water boiled here at the equivalent of a hundred degrees centigrade, but when it boiled, it was hot enough to cook foodstuffs and cause burns.

As there were four dimensions, the surface area and the volume of objects increased surprisingly quickly with increasing diameter. Therefore the constructing of wall surfaces consumed more material than I was used to think, even though the wall construction board was quite thin in the temperate climate and I had common walls with the neighbours in the cluster of eight apartments. The constructing habits were affected by the four dimensions so that walls were constructed of construction board rather than laboriously of timber or of wall slats extending into two dimensions.

My apartment was located at a similar, sparsely built area as the place where I was taken care during my incapacity. Actually the sites were not far from each other; if I pulled myself together enough to take a longer walk than usually, I could go to visit my familiar therapists there. They were surprisingly pleased to maintain contact with me, as if I were rather a friend than a former patient to them. And perhaps that was how they saw me. It probably did not make much sense to compare too minutely the social roles of my home world with what I encountered here.

Home world? For some reason I still needed to practice calling my apartment "home" even though it was the most homely thing I could have here, and this whole world with all of its four dimensions was now my home for the simple reason that from the local viewpoint my native world had never existed.

Next to my apartment there was a road with a vehicle or two passing by occasionally. Nearby it was perpendicularly touched by another road. At the crossings roads came to a contact but did not cross through each other, because in a four-dimensional road network it would not have been necessary. Accordingly, there were no traffic lights or zebra crossings, either, not even in cities. Roads were not crossed but circumvented.

The road was lined with largish plants with trunk and roots. I called them trees, because to me they passed for trees. Further away there were also some rootless plants that the natural forces could drive from place to place. They were more slenderly built and therefore survived even when ending up in a place where nutrition was scanty.

The terrain around my home was rather even, but further away, in the cardinal direction named "fast" according to the pole circle located in the same direction, there were hills covered with forest. There was no ocean for the eye to catch, but in some places I caught a glimpse of a pond or two.

So I had a home whose bedroom, kitchen, and bathroom fulfilled my most important bodily needs. Eating was a need that had me leave my home now and then, as the food did not come to my home but I had to go to fetch it myself. The fetching place was a storehouse a walk of a few minutes away. In my mind I called the storehouse "corner shop", even though there were no sales staff, but merely a janitor and occasionally visiting stock distributors. Nobody registered anything that I took from the storehouse. Even the janitor merely glanced at me, and only if he was curious enough and not too busy. My searching eyes did not find even an automatic surveillance device which could have observed my acquisitions.

A little bit later I learned that as I eat my bread without cost, I also do my work without salary: with the support of my teacher's references I got a job and I became a producer instead of a mere consumer.

My job resembled the temporary summer jobs I had been doing between university semesters. After a short introduction period I got for my task the design and execution of algorithms for various kinds of industrial production planning; the office in which I worked appeared to be some kind of consultancy service or design office.

The calculating devices with which I did my job were quite

large, even compared to a desktop computer, and their memory capacity was quite modest, but they worked reliably and calculated undeniably quite effectively considering their — if you pardon me — primitive structure. In this world, too, the calculation process was accelerated by making the machine components as small and quick as possible, but such a wonder of technology as an integrated circuit had not been developed here for the purpose yet. Therefore I was impressed by the achieved speed of the calculations, and the switching on of the machines always left me with a heartfelt reverence: they were completely ready for service before my finger could even leave the start button.

The calculation tasks consisted of rather simple stages, and the programs were short already for the reason that they had to fit into the small memory. Some of my tasks, like strength calculation, appeared laden with a responsibility that made me quiver, but they were given to me without any special ceremonies. I was particularly frightened with the thought of a task that would challenge my four-dimensional perception of space.

My team had four women and four men, obviously by a mere coincidence. None of them seemed to be a manager. Customer contacts, to use a term familiar to me, were mainly taken care by a certain man and a woman in the team, but otherwise all the team members were equally responsible for the activities in the office and its relationships to the world outside.

The strange freedom was manifested also in my working rhythm. There were no office hours; I could come and leave as I wished. The only restraints of my working time freedom were the few tasks that needed to be ready in time for third parties, communication with the rest of the team, and an indefinite inkling telling me that downright laziness could be regarded immoral.

I still had many unsolved questions about the social system, but I put my questions carefully and choosingly so that I would not appear to others worrisomely ignorant. Now that I no longer was a ward of an institution I felt that I needed to inspire others with some confidence.

”What kinds of things can I take from a storehouse?” I ventured to ask my female colleague Ribbon once that we were resting our bodies for a moment on the backyard recliners during a break. ”How do I know what kind of things are proper to take?”

”How could taking a thing not be proper?” wondered Ribbon at my question and turned her head toward me. I did not reply immediately as I had difficulties wording my question to a person who obviously had no concept for a thing like

money.

"Can I, for example, go to get myself an aircraft?" I asked then.

"You could take such a thing, too," Ribbon pondered. "However, I think that it would not be solely for you, as it is a large and complex device. But if you need an aircraft, why should you not take one? What kind of mission would then be such that you need to get an aircraft of your own for it?"

What could I say to that? Entertainment? Traveling? If I now presented a rather egoistic reason, what would it tell others about me?

"Can you fly?" asked Ribbon without waiting for my reply any longer.

Me? With a four-dimensional aircraft! Horrors!

"No," I replied. "But if I could, I could visit with it, for example, sparsely inhabited regions."

"In that case you could suggest an agreement to a pilot," said Ribbon. "Or several pilots, if the task is not suitable for a single pilot to do. The resources invested in the aircraft would be quite idle if you were not using it for your occupation."

The confines of my liberties finally began to loom ahead. Now it was surely also time for me to change the topic before somebody would direct me to an aviation course and without doubt immediately out from it, too.

"But I got an apartment whose construction required plenty of resources," I said. "Almost like constructing an aircraft."

"Everyone needs to have a shelter for living. Life would be very troublesome without housing."

"Others have taken a lot of trouble to take care of me," I tried to explain my curiosity about matters that probably even a child ought to know. "Are all the people working just to take care of each other?"

Ribbon turned on her side; her body was obviously awake. I had to prod mine a few times with my nerves to get it into full activity.

"Work is done because it is a good way to be a human being and a member of the society," Ribbon replied. "Not everyone feels an urge to take care of others, at least not continuously, and there are many other reasons to work besides being a good person. Giving and receiving services is a convention that works and nobody feels a need to change it. Or do you have an alternative suggestion?"

"I have none," I said and let the topic fade out.

There may have been a hint of amusement in Ribbon's eyes even though she was too discreet to show it openly. My colleagues knew I had been a patient in an institution, where I had begun my life anew, but it did not seem to reflect on others' attitude towards me. I was in the position of full

standing though I could still have been compared with a child in many respects. Luckily I still learned rapidly, without forgetting anything, and the pace of my learning was limited mostly by the fact that I did not know what I lacked until I encountered the lack.

When I eyed Ribbon in a like manner I noticed that she was a beautiful woman, in the same way and for same reasons that I would have regarded a three-dimensional woman beautiful. My ability to observe had been gradually improving by the use, and I believed that I could have sketched Ribbon's face even from my memory. It occurred to me to draw on a paper a three-dimensional equivalent of her face, incorporating into its features her four-dimensional beauty, but I remembered that there was nobody here to whom I could have shown the results of my work; these people would scarcely regard such work as art.

The rims of Ribbon's eyelids were almost unnoticeably arched. When she blinked her eye, the contact between the eyelids began from the other side of the rim and created an illusion of a rotating flip, quick as a twinkle, around her pupil. I could notice it only by watching keenly, but it became one of the features by which I remembered her.

I was already considering returning to my work when Song came out to ask Ribbon to help her, having our break end. I went back in and sat down at my workstation consisting of two small tables. One of the tables was almost completely occupied by a box-like programmable calculator into whose controller I set my hand and began to input numbers with it.

The number system used here was duodecimal, and it took me some time to get used with it, but it did not actually startle me; in my past life the computers had already familiarized me a little bit with other than decimal number systems. I had expected nine-fingered people to use, for example, nonary system, and it had in fact been a vying candidate in the distant past, but the mathematicians enthused about division did not give up until they got their easily divisible duodecimal system first in common use and finally as the only way to count. Therefore I, too, had to learn to think in dozens and grosses instead of tens and hundreds.

Also the machines had been strange to me at first sight: the display device felt quite limited and the controller had nearly nothing in common with a keyboard except its use to input data. However, as I got accustomed with the machinery their use became fluent and familiar, as by their most general principles they were nothing else but computers. Had I been a member of my parents' generation, I might even have felt nostalgic warmth using them.

There are no evenings here, but finally the feeling inside my

head become evening-like enough that I could call my session a workday with a good conscience. Ribbon had already left before me, but Song's working period was still in its first half. Working in three shifts could have been here a much more natural way of life than in the world of day and night.

After my goodbye to my colleagues remaining in the office I left walk back home. My return trip passed for its first part through a low-growing stand of forest on a path trampled on the ground. Walking among the vegetation shining in the soft, pure-white skylight I occasionally got a chance to observe the four-dimensional fauna. Most of the animals I saw were small enough to rest on my palm and had an insect-like appearance with their hard shell plates and several long legs. Once I caught a glimpse of a nimble, lap-dog-sized animal that I could have believed to be a mammal. It had eight legs and short fur, dark in ambient light but colourfully sparkling when the light reflected from it in an obtuse angle. Among the settlement I could not remember having often seen animals; I could recall only one largish, eight-legged creature, like a dog with teddy-bear features, tranquilly lumbering through a courtyard area and passing by a road next to it. A pet or a wild animal, I could not tell.

Now and then birds or other flying animals passed through the air. Some of them had two wings, some others an unbroken collar surrounding their body in the plane of lateral directions, moved and flexed by the limbs integrated with them. The rigid variant of the collar wing had been adopted to many aircrafts. The flying animals were two-legged, regardless of their wing type, and they secured their balance on the ground with forked toes.

In the latter half of my return trip the path joined a side-road, which joined beyond a few residential houses the main road passing by my home. I walked along the side of the road with a square-shaped cross section, staying a meter off from the road edge. Car drivers whizzed by in their vehicles, some of them with quite high speed, trusting that I do not stray into the driveway. The passages of the vehicles felt around me merely as gentle wafts of air, because similarly to sound, also their energy became effectively dispersed into the four-dimensional environment.

The children from the apartment adjacent to mine were playing by the side of the house when I came to the place. I was one of the three people living alone. In other apartments there were living couples, each of whom had at least one child. Four of the children were now present, all of them appearing to me as if they were of primary school age. Three of them sat on the lawn chatting. Now and then they glanced at the fourth one who stood whirling around a ball attached to a thin string about



one meter long. I had seen children engaged in a similar activity earlier, but the meaning of this somewhat monotonous-looking game had begun to dawn upon me only when I had seen more grown-up children simultaneously whirl several balls in various crosswise directions. The fascination of the game as a virtuosity was added by the fact that in a four-dimensional world it was possible to whirl the ball also horizontally without the string touching the player's body.

"Shadow Man!" shouted one of the sitting children my nickname when he saw me. Others waved to me, like people were in the habit of greeting each other over a distance in this world, too. I returned the greeting in a like manner.

I did not have any natural name. Out of politeness to me my therapists and colleagues uttered my Finnish name, but I had the feeling that they were trying to avoid its use. Perhaps they found a meaningless string of sounds somehow unnatural for a human name. Children, on the other hand, did not even try to follow the conventions of their culture if they did not find them natural enough. To them it was right to make me a name that was easy to say and described me well. Due to its origin the name was perhaps not very flattering, but it was a creation of the local culture and connected me with them.

I had become acquainted with the children by sitting in their company telling stories to which they liked to listen. I had become their storyteller. I seized the opportunity and told them stories that I could scarcely have told to anybody else: stories about three-dimensional world from which I had come. Perhaps they did not take my stories very earnestly but they had fun listening to me. My descriptions of polar glaciers, congested traffic, day and night, and other wonders of three-dimensional world made them laugh in their weirdness. When I explained to them that a three-dimensional being was completely flat, like a shadow cast on the wall, they quickly named me Shadow Man, or more shortly just Shadow. I had once heard even one of their parents use this name about me, probably without any idea about its origin.

One of the children came to me and asked me to tell them yet another story. I paused for a while to think whether I would find anything worth telling from my already rather hazy brains, or if I should suggest putting the matter off till another time. The boy's mother, however, got me out from the scrape by calling him back home from an open window. I continued my way to my home door and opened the latch. Very few doors had locks here, as property ended up in wrong hands very rarely and even in such cases mostly out of ignorance. Inside the door, right next to the doorway there was a box into which the postman or other people left their deliveries while the occupants of the apartment were away. In the box there was a

leaflet which I picked into my hand. There was no need to fear getting advertisement, as pushing items forward on people was a completely unknown concept to people here, and absurd even as a mere idea. The paper was probably some kind of announcement.

My motor coordination obviously needed some further honing, because when I attempted to step indoors with my eyes at the paper I stumbled on the doorsill and fell flat on my face on the floor. The experience was not any more comfortable as in the three-dimensional world. I heaved myself up on all fours, and at the moment I heard a female voice behind me:

"Do you need help?"

I turned my head. The speaker was my neighbour, a student, or whatever people preparing themselves for a profession are called here. I was already about to give a negative answer and get up on my feet, when suddenly the world began to tilt around me. After a moment I was lying on my side on the floor.

Had I really managed to fall down even from all of my four limbs!?

The woman, whose name was Garland — or actually "a braid of decorative plants", but "garland" sounds more convenient to me — bent over me and would probably have repeated her question, but with a burst of energy I quickly scrambled on my feet before I could further embarrass myself.

"I am sorry if I startled you," I replied. "My head seems to be a little numb after work."

"It happens to me, too," Garland replied smiling a little.

"I do not really understand how I can fall over when I am already on all fours. That must be a new record of clumsiness."

"You forgot to support yourself. I would have fallen, too."

My mind went blank for a moment trying to understand what Garland had said.

"Er..." added Garland hesitantly. "May I borrow your bread knife?"

"Yes," I said, waking up from my thoughts. "Of course. I go to get it."

I removed my laceless footgear and went to the kitchen to get the knife. The knife was as long as the bread knives I had formerly known, but one of its widths was large. For its larger rim it was sized rather like a large meat-axe than a knife. It had to be, because the knife was designed to slice all breads smaller than its width with a single descending movement; into breads larger than that it would merely puncture an oblong gash.

"Bread" was a broadly defined concept here, as it meant any bulging or flat piece of edible substance baked from dough-like substance, and in spite of its name "bread knife" was a quite versatile cooking tool. I could remember hearing

the word "bread" used with extra qualifiers even in contexts unrelated with food.

To avoid further accidents I handed the knife to Garland handle first, holding it from the base of the blade.

"I broke mine," explained Garland her need for the borrowing. "Out of clumsiness," she added, timid to say the word after my stumbling show.

"Luckily I am not completely alone with my shortcoming," I said and made her smile a little.

"Thank you. I will bring this back as soon as I have fetched a new one for myself."

"There is no hurry."

Garland left and I closed the door. Seeing the doorsill reminded me of her strange expression "you forgot to support yourself".

During my therapy I had frequently fallen onto all fours and continued my falling even beyond that. Then I took it to be inevitable, but not any more. Not now that I could run, jump, and make pirouettes in all kinds of horizontal directions without falling down.

I let myself slump on the floor imitating my stumbling. My palms and knees had been spread apart, firmly planted on the floor just like they were now. How could I not be supporting myself then?

I realized the obvious answer as soon as I began to sway on my limbs. How could I not have understood this? Even a dining table had eight legs, one at each corner. I had only four limbs, and all of them were under me in the same two-dimensional plane. They could as well been on the same line, one behind another. Nobody can keep in such a posture except by continuous balancing. The right action would have been to move one hand or leg even a little along the live-still-direction so that the contact points to ground form a tetrahedron. Then I would have had a minimum support similarly to a three-legged stool in the world more familiar to me. My head was quick to learn, but I noticed that I would need to have my spine learn, too.

I picked up the leaflet that had fallen on the floor, a small slip of paper copied from a handwritten original. The announcement, written by some enterprising citizen, was a warning about an insidious surface damage of the road along which I had returned to my home. The road maintenance crew had got a copy of their own and would begin their work quite soon.

I took the case as a small droplet of equalizing to the three-dimensional blunderer.

## 4

A metropolis has to be seen by one's own eyes. At least I have considerable difficulties in describing to anybody else how it looks when thousands of millions of people bustle in an area whose diameter is similar to Helsinki.

I had completed a flight feeling about two hours long with a vertically ascending, collar-winged hybrid of a helicopter and an aeroplane. Urged by Storyteller and his friend Strongfoot whom I had met later I had left for the city of Skills with them. Now we were riding in a borrowed car, speeding along a driveway as wide as the whole block, divided to who knows how many lanes — or "lines" in the local parlance because the centerlines rather than the edges of the lanes were marked on the street surface.

The rectangular street network was the dream of traffic planners. An enormous multitude of cars, vaster than I could even estimate, was flowing smoothly, without stopping anywhere, as the lanes near the street edges were reserved for separating and merging traffic, and on the inner lanes it was possible to drive free from care even at a high speed. Even more significant was that the broad driveways criss-crossing in three perpendicular planes nowhere intersected with each other, so there was no intersecting traffic to regard. It was possible to run from block to block with no need to slow down at all. Traffic lights as well as zebra zones were unnecessary.

Traffic was "oriented right-handed". It was possible to rotate the cars along the plane of lateral directions during the driving without affecting the direction of propagation, but the traffic conventions called for keeping the vehicle in a determined orientation with respect to the street and surrounding buildings, and for restoring the orientation after turning at a junction. Experienced drivers did the correction simultaneously with turning at the corner.

Also pedestrians and other light traffic had been regarded with excellent generosity: the driveway area between blocks had been divided in the middle with a greenery zone which was connected to the sidewalks through a further gap between the halves of driveways on both sides of the greenery. At the ends of the blocks there was sufficient space for both pedestrians and the traffic turning from one street to another.

We had met Strongfoot's parents and spent a while chatting and eating snacks as if we were having a typical Finnish afternoon coffee. The topics of conversation were naturally

unfamiliar to me, as I saw them for the first time, but I fluently listened to them and the news about their family.

Now that we had left them Strongfoot and Storyteller wanted to show me the city life. A block of flats I had now already seen during the visit. The apartment had not been special, and it had resembled quite much my own, but the structure of the staircase showed us that it was designed for a much larger number of occupants as in buildings of equal height in the three-dimensional Finland. While we had been descending towards the ground floor we had indeed seen surprisingly many other people in the staircase.

Riding in a car the turning at a junction was in principle simple enough for me to perceive, but the peculiar cornering movement still confused me. I was relieved that my tasks had not demanded me to drive a car; driving licenses were unknown here and even the verification of driving skills under professional supervision was left on the conscience of the drivers. Our ride, dizzying in many ways, took us into a car park below an especially high building.

The building into which we had arrived contained both apartments and offices. Because it was one of the highest in the city, its topmost part was reserved to be used as a sight-seeing tower, for visitors who wanted to have a good view over the city.

The tower was mostly hollow inside, except for its supporting structures and the machinery transporting the users of the building. We ascended to the top, where we found plenty of room for viewing the scenery, eating, and spending time. Abundance of room came in need, as there were plenty of visitors. Most of them were eating their own provisions. The space was not an actual restaurant, even though some food was available for those who did not bring any of their own with them. Keeping all of the visitors fed in the scale I was witnessing would have required unpractical amount of resources.

The same relationship between diameter and volume at which I had been marvelling in my newly received apartment repeated here in yet another manner. The space was not full of people, and yet I felt that there was crowd milling around everywhere.

When I stand in the middle of a tightly packed group of people in the three-dimensional world, there are five or six people touching me in various directions. If I am standing in tightly packed but soldierly rectilinear formation, I am in contact with only four people, but I can easily touch four more people in diagonal directions. In a four-dimensional through these numbers can be double or even triple. It is possible to have even 24 people effortlessly seated at a one-meter-wide

rectangular table here. The same mathematical laws that create around me a bewildering amount of vacant space can also fill the space with a multitude of people that I had never imagined seeing around me. I could already sense the backwoods hermit restlessly stirring inside me.

A sea of roofs extending to the horizon spread behind the windows. Here the horizon was not as far away as it was on Earth, but there was still quite a number of buildings inside its perimeter even looking along a single line, not to mention their number when they spread everywhere to fill the whole scenery extending to all six cardinal directions. Strongfoot pointed buildings and landmarks for me.

"Are those canals?" I asked pointing at the waterways entering the city. "First I thought them to be rivers."

"There are a few natural rivers among them. The rest are canals."

"Most of them have a roof above them."

"A city of this size needs plenty of raw water," Strongfoot explained. "Around the city there is enough water, but it is scattered, and a network of canals is needed to gather it here. The roof above the canals protects the water from unwanted impurities inside the city area."

"How about the waste water?"

"It is decomposed with heat inside the city. Conducting it outside the city would not be very practical."

I did not see steam rising up anywhere, even though the city was decomposing the waste water of thousands of millions of people. The process must obviously be happening inside a closed volume, which would be only sensible because there could scarcely be anybody willing to let all the energy bound to the water escape.

"Where do you get all the energy that the city needs?"

"From this window we can see half a dozen of power plants. Elsewhere in the city there are many more."

In the parlance of the city inhabitants "power plant" usually means a plant releasing the second order excitations of matter. Because the atoms here do not have nuclei, there is no nuclear power here, either, but second order excitations are high enough that the energy production with them is not far below what is possible with nuclear power. The form of energy does not produce pollutants and is generally assumed to be also safe. The power plants were located in the midst of the city side by side with the other buildings.

"Is there never a shortage of energy? I am surprised to think that the energy can be used even for decomposing waste water."

"There is plenty of energy. What limits the use of energy is the waste heat produced by it. Used energy does not disappear

anywhere but remains in the environment causing unfavorable effects.”

Heat pollution was a problem familiar to me from the large cities I knew from my past. A four-dimensional sky could dissipate plenty of excess heat, but I did not know how far such a benefit would suffice for a population as large as this one.

Taking his turn, Storyteller pointed me out buildings related with the organizing of city life. I say “organizing” rather than “administering”, because I think it matches better with the word Storyteller used. I had already been wondering how enormous pyramid of bureaucracy would have been needed to administer a city of thousands of millions, but Storyteller explained to me that there was no controlling center in the city, but it was composed of areas of different type adjusting to each other with small changes here and there propagating through the structure like a chain reaction. His description reminded me of cells in human body exchanging messages to agree about how to form new tissue.

When we were descending from the tower Strongfoot suggested that we leave the car for a while into the car park. He wanted to introduce me with the mass transportation system of the city. After getting outside we started to walk along a small park towards a concert hall further away to let me listen to the music of a large orchestra. We did not walk all the way but came to a conveyor-like structure and stepped on it along with the flow of other people. The conveyor was very elastic and stretched beneath my feet into a multiple length so that I had to reposition my feet on it a few times. As it stretched its speed increased in a matching proportion, as did the distance between people standing behind each other. Strongfoot reminded me that lengthwise scattered people must avoid standing close to each other, because at the end of the section the conveyor would return to its original size squeezing people towards each other. To guide the users the conveyor had been marked with zones of different colour allowing people to stand in them side by side but not behind one another. Even though the speed of the conveyor was not as high as that of a car ride, its immediate availability made it a very convenient and prompt transportation method.

The conveyor passed along medial greeneries and occasionally crossed junction areas where a vast flood of car traffic flowed past us in many different directions. Part of the time we travelled compassed by building complexes. The multitude of the urban sounds blended into a roar of a storm, not deafening but otherwise very impressive. Its most profound parts formed a rumble that resonated in my stomach and spine rather than pressed into my ears.

The end of the conveyor section began to be near, and as

Strongfoot had warned me, the conveyor began to contract and compress the flock of people ahead and behind toward us. We stepped off the conveyor at its end from which there was not much walking distance left to the concert hall.

We came to the concert hall, chose the nearest of its numerous entrances, and went inside. There was no doorman, as I could guess, but inward from the doors the architecture of the building was familiar enough to me that I could undoubtedly have recognized the purpose of the building even without guidance. There was plenty of vacant seating space in the hall. Strongfoot guided us to adjacent seats he estimated to be well-placed. In the front part of the hall the musicians prepared their instruments for the performance in a way appearing quite familiar to me. Expectant silence fell upon the place in good time. There were nearly nobody arriving just before the concert, which I thought to be a remarkable achievement considering the great number of seats in the hall.

The concert itself was... well, an experience of its own kind. I could not decide with which genre I should have compared the performance. I could hear even without much of expertise that the musicians were skilful and expressive, and also the language of the musical harmonies was, as I had already noticed earlier, familiar by its basis. The sound of the large orchestra in a spacious, by its volume even luxuriously spacious hall was, of course, also magnificent. Perhaps I would find my own favourites here later that my ears become more exercised.

My attention was drawn to the fact that there were seats only in the central area of the hall. The zone in front of the orchestra had been left empty, as well as the rear part of the hall, especially the areas close to the rear corners. Strongfoot told me that in large halls the seats are located in the "best area", while in small halls all of the floor space is used. When I pondered on the matter, the reasons for the practice began to dawn upon me.

As there were music lovers here in a ratio similar to my native world, each musician had a similarly sized audience. Therefore it was more natural to increase the number of concert halls rather than their size. However, a hall with a small diameter did not have the acoustics of a large hall, so it was necessary to have at least a few large halls, too.

If an orchestra played in a compact configuration in the front part of a large concert hall, the proportion of direct sound in a rear corner of the hall could decrease to a level at which the acoustics already began to lose its firmness. Therefore there was the "best area" in which there were arranged the few tens of thousands of seats that the privileged and famous artists playing in large halls typically needed for their audience. If the



performance was so exceptionally popular that all the half a million people the hall could take really wanted to be there, the majority of the listeners had to listen to the performance standing on a spot of hall floor they managed to reach.

Our trip continued. A tour in a metropolis would of course be nothing without shopping, even though in a moneyless economy discount sprees, advertising campaigns, or other stimulations of consumption familiar to me were all unknown. We went to watch how the products change their owners in the largest and busiest delivery halls, the local hypermarkets. There were plenty of people astir, and the carts and burdens of items could have belonged to the life of any three-dimensional department store. There were differences, too: the illumination had been more modestly arranged and the room height was lower than in the hypermarkets I knew, because no effort was made to entertain the customers further than was thought to be necessary for item collection visits. In the department delivering the most technical items I finally saw one of the wonders at which I had come from countryside to a city to gape, namely tailored machines. Those things that were on the racks were not any more special than those available in the more rural areas; there were merely more of them. At the back wall, instead, there was a table onto which the staff carried machines that had been built one by one to meet the specific needs of the customers. In a pecuniary economy such machines would undoubtedly have been expensive. I could not guess what kinds of conditions the customers would have to meet to be able to order a special machine to their own liking.

We went to get something to eat. Living in a time without days and nights I could not name the meal a breakfast or a supper; from my viewpoint it could have been a late lunch or an early dinner, if the time were measured from the latest significant revival of my thinking processes. We entered the ground floor of a skyscraper and stepped into premises looking more like a restaurant than any other dining place I had so far seen here. As usual, the customers were expected to have more alacrity for self-service than in three-dimensional restaurants, so I could as well call the place a canteen. The meals we fetched from the counter after a while had been prepared with care and professional experience, clearly inspired by vocation instead of salary.

My meal, laid on a trough plate, contained a typical example of the foodstuffs that were difficult for me to classify based on the experiences of my former world. I had earlier asked Curl whether the local people eat meat; for the word "meat" I used the common name for human and animal muscle tissue. Curl and the others in the room had looked at me perplexed, and after a moment Curl had given me a negative

answer, slowed down by the strangeness of the idea to her. And yet the food we had eaten together appeared very plainly like meat to me, and I had been told that it was good for me to eat it because it was similar to my own muscles. Later I had learned that the "meat" I had eaten was a fruit of a certain mobile plant, detaching by itself when the tissues of the plant renewed. While the complicatedly structured fruit was still ripening the plant used it for grasping and nutrient uptake, and dropping it after its ripening also for reproduction. The moving parts of the fruit were similar to muscles and also utilized the chemistry of animal muscles in their functions, so it was not odd that they also tasted like meat. After thinking about the matter for a long while I had to conclude that I could not decide whether the food I had eaten was meat or not. Now this same peculiarity of Nature was again on my plate, in a spicy sauce, next to seed cakes and leaves I supposed to indisputably come from the vegetable kingdom.

After entering the new world of tastes and fragrances I had to create new mental associations with them and the surrounding world. Meat felt in my mouth similarly tough and fibrous as three-dimensional meat, and its taste was roundish, to use a familiar synaesthetic metaphor. The taste was simpler than that of, say, pork, and somehow paler. I cannot explain where I had got the latter association. The taste did not differ from plants as strongly as the taste of pork, but was the contrasting between pork and the varied vegetable kingdom, either, anything else than a convention my mind had accepted.

My sense of taste recognized six basic tastes, such as sweet or sour. Some of the six tastes invited more strongly to eat than some others, and some of the tastes required exercise before becoming enjoyable. I tried to name the tastes comparing them with my earlier experiences, but I could not find naturally matching pairs. Actual desserts were not eaten here, although the main dish could sometimes be separated into two different servings. Accordingly I could not name any of the tastes as "sweet", which would have been a typical property of a dessert. Sweets were unknown, but snacks existed.

Cutlery was used, and it came in more numerous types than the forks and knives I knew. Geometric reasons demanded the four-dimensional cutlery to have certain distinctive features: a straight row of prongs of a fork could not have given a sufficient support to a morsel, for the same reasons that the four limbs under my body had not been enough to stop me from falling on the floor earlier. To my amusement I noticed that Oriental chopsticks would instead have worked here, too, with the reservation that here their use would have been to me even harder than in Asian restaurants.

We sat at a table sized for ten persons chatting with each

other. There were three other diners sharing the table with us, all complete strangers to us. Strongfoot and Storyteller nevertheless chatted with them, too, and neither side seemed embarrassed for being invited first time into a discussion with each other. I listened to the discussion from the side, observing concepts which I did not know yet and which I could later inquire of my companions.

Finally there came the time to start our return trip to home. Replete and having seen the bustle of the city, I being even a bit numb with it, we returned the car to its lenders and continued our trip to a nearby airport, an open area sized like a parking lot on the outskirts of the city. Because the aircrafts took off vertically there was no need for runways, and with the capacious four-dimensional air space a small guidance room at the end of the airport building was also sufficient for flight control.

On our way back I recorded my experiences into a diary I carried with me, a sheet reinforced with a foil on the backside. I had begun my diary as short entries in Finnish language, and later, to practice my language skills, also in the local language. After I had begun to tell my stories to children also my diary entries had begun to become more and more storylike. Finally I had even rewritten the first part of my diary in two languages. It was like a story about me, about my settling into a foreign country, a diary of an alien coming from far away.

During the flight my head began to feel somewhat inert, and I sunk into the featureless haze among which my brains usually rested. I sat on my seat straight and with my eyes open. If somebody had come to talk to me, I would have replied, sluggishly, tersely, and superficially, but probably meaningfully. The talker would have heard from the very first words that my brains are resting, and he would have politely refrained from further attempts to address me. In case of need he could also have asked me to wake up, and I would have waken up for a moment into sharp and clear presence of mind, and after the need becoming satisfied fallen back into the haze.

Whoever watches out of the aircraft window at the cruising altitude can see with a single glance millions of cubic kilometers of land area, rarely obscured even by clouds. Each of the cubic kilometers contains a thousand cubiform hectares, or a thousand million cubic meters. A passenger absorbed in details can easily have the scenery slip behind before all things to see have been seen.

The difference between a metropolis and scattered settlement had been startlingly great. I was almost relieved to get back to the peace and silence of my home, and I had called myself a capital inhabitant while I had still lived in Finland! Perhaps I would get used to cities as time goes on. Strongfoot

and Storyteller had become used to them, too, and I think my brains were of the same type as theirs.

When circumstances get tough, even a fish will walk.

"Remember to stay inside the world!" I reminded the children balancing themselves on their route forward.

I had drawn all the way across the sand field on the yard two hatched rims. Between them I had left a crack barely wide enough to stand on two feet set side by side. The crack in which the children were playing was a three-dimensional world, or at least the best imitation of one that I could create for them. They moved inside it carefully, behind each other, or also side by side, but only in one lateral direction; the other one I had marked off with the rims.

"That is a fence," I said when the children arrived to the chain of dry branches and other plant parts I had lined across the miniature world.

"So slim," said the boy standing in front.

"And yet it blocks your way", I remarked. "Can you get over it?"

"Let us dig a tunnel," suggested another child.

"We can get over," replied the boy and jumped. Others followed the example.

The victory was only momentary, because the fence of branches were followed by a zone from which I had swept away all dust and sand. There was only the darker soil left.

"This is a river," I explained. "It is too deep to wade and too rapid to swim across."

"Let us pass by it," said a voice from behind of the group.

"There is no way," said the foremost boy and pointed the sides of the river reaching the rim marks. "In Shadowland it is not possible to pass by a river."

"Shall we now dig a tunnel?" suggested the other child again.

"If there were an island in the middle, we could jump," said a little girl.

I saw the eyes of the oldest boy sparkle.

"We need a bridge," he said.

"Excellent!" I replied, and the quickest children were already dragging my fence branches to the "river".

"I have once been on an island," explained the boy. "We went there along a bridge."

"And in Shadowland also the rivers are usually crossed along a bridge," I said.

When the branches had been arranged on the river, the children began their delicately balanced walk over them to the

opposite side.

"Luckily you made it in time, because the sun begins to set and soon it will be dark," I said and took out from behind my back a sheet of paper on which I had created my work of art, a bright-colored round blob. I would rather had used a portable lamp, but I could not find one for this momentary need. On the other hand, I do not know if it would have looked particularly impressive in the bright skylight anyway.

"There is a lamp on the sky!" laughed the little girl at my image of the sun.

The children knew about what I was talking as I had once managed to borrow a worksite illuminator and shown them in a room made dark how it looks when all the light comes from the same spot moving along the sky. The children had certainly seen worksite illuminators before, but probably never imitating a light source moving on the sky. The performance had obviously stuck in their minds.

"An unique game!" laughed the amused mother of the little girl, having arrived to the side of our world. "Have you invented it yourself?"

"I believe so," I replied. "This game is my second nature."

Also the father of the girl came to the place somewhat after his spouse.

"That can be useful to our children later that they become more familiar with mathematics," he surmised.

"Thank you for playing with them!" said the mother.

"I enjoyed it, too," I replied.

"I became a shadow!" declared the little girl stepping out from between the rims.

"That game reminded me of the balancing games in my youth," told the father. "We were standing on a line with one foot only."

"In Shadowland we stand on two feet," remarked the boy leading the others.

"But one can go round only by half," added another child.

"Shadowland itself turns around only by half," continued the first one.

"Would our son now turn around towards the meal waiting for him?" suggested the mother.

"We will continue next time," I promised to the boy departing obediently with his parents, and to other children, too.

I had already become somewhat acquainted with the children's parents, too, once that we were out in the garden spending our leisure time together. I had made a four-dimensional version of a deck of cards and taught them to play poker. They learned the mathematics of the game quickly. The women also found out that the opponents' hidden cards could

be inferred from the facial appearances of the opponents, and even though I thought I was keeping myself the most expressionless of the group, some of the muscles in my four-dimensional face always gave away my thoughts to them. I was the first one to run out of the pebbles imitating money. I also told about bluffing to them, although it was somehow a pity to corrupt the first rounds of poker in my life played in complete innocence.

They tried chess, too. I considered making the board three-dimensional, but I suspected that the game would have become too heavy to play until its end, and reaching a checkmate would have required very carefully designed rules. Finally I introduced them to the traditional, two-dimensional board that they reputedly called "strip" or "slat" because of its puny shape.

I do not know how well the occupants of the house knew my origin. Perhaps at least some of them found me weird. The games I taught them might further strengthen the impression, but they might also make it more favorable.

Thinking about outdoor games I noticed that there was a largish tree near the house, and below its branches there was just right amount of space for a swing. During my leisure time I went to fetch rope and construction board for swing materials. I also cut the board into suitable pieces which I stacked to make the seat of the swing. Tools for the task I borrowed from a nearby workshop.

To my surprise I noticed that the ropes refused to hang from the branch. My knots either did not hold together at all or opened with a slight sidewise tug. When I managed to make some kind of loop around the branch, it slipped down from the branch. For an elegant finale I fell down myself, too, when I tried to support myself holding the branch by the mere bend of my arm.

Only when I examined the rope on the ground I realized that the problem was not in the rope but in the empty space surrounding it. In this world knots could not be tied the way they were tied in a three-dimensional world, as they had too many directions and ways to open. Especially prone to dissolve were the knots I made with a rope having a round cross-section. Bands wide into one direction worked better. My memories about other persons using ropes reminded me about the fact that knots were made here only rarely and for compelling reasons. Usually ropes were fastened with various kinds of clamps.

To replace the ropes I went to fetch firm textile band which was available in various widths and thicknesses. I came back to the tree and fastened two bands as wide as my palm to its branch using clamps. The band wrapped around the cross-

sectional shape of the branch and felt quite reliable when I tugged it. When I also twisted the lower parts of the bands into rope-like shape and got the seat fastened to the bands, my classic swing was complete. I sat on the seat and returned to my childhood. I gathered speed. The swing worked impeccably.

Then the movement of the swing began to lose its even symmetry. Was my speed-up off the midline or was there too much difference in the lengths of the bands? I made a corrective movement. The result, however, was not exactly what I intended. The swing seat began to turn horizontally. I tried to get it back under my control with a sidewise sway. Both ends of the seat board began to draw a skein curve of their own. I let the speed of the swing slowly slow down and struggled against the seasickness waking up inside me. Finally I could step off from the swing, and having learned my lesson I fastened a third band to the back of the board. After that the movement of the swing was no longer as graceful as in the beginning, but at least it submitted easier to the control of its users.

Garlad had come to watch my working.

"What is that?" she asked surprised.

"A swing," I replied. "Children like to swing."

"It has three supports."

"And a seat," I added. "This is what I have been using to swing."

"Would it not be easier to support the swing with a single rope? You can attach a seat to such swing, too. It could also be easier to control."

"It would be possible," I replied. "I have used such swings, too. They just do not have the same feeling in them."

Garland looked at the swing perplexed by what I said.

"What kind of feeling?" she asked.

"It is hard to explain. It is a childhood memory, a memory of swings that worked differently."

"Where did you spend your childhood?"

I sighed a little.

"I am a shadow image," I replied. "A citizen of Shadowland."

Amusement made Garland smile.

"I thought you say so only to the children."

"I came to this life only recently," I explained. "Only a little while before I moved here I was in therapy, having lost all the abilities I need to spend my life. Thanks to my therapists I recovered. But for the time preceding that period all my memories are from a world completely different from this one."

"Different?"

"I was flat like a shadow living as a part of the wall surface,



knowing of nothing else. My world had only three dimensions."

"Did you feel being bound to something that...?"

"Three *physical* dimensions," I interrupted. "My world had no live or still sides. There were only right and left. There were two ropes in a swing, four legs in a table, and five fingers in a hand."

Garland watched me, unable to say anything for a while.

"That is how I remember my life," I added. "And I do not say this to tease or scare you."

I do not understand how it is possible to live as a shadow, but if you say so, I will not protest."

"You do not need to be wary of my feelings. My teacher has already told me that the world of shadows is an impossibility. There can be no matter or life there."

"But you have memories from there."

"I could tell to you stories about my past life every time I return from my job, down to smallest details. I could go on telling my stories time after time until the children of our neighbours have grown to adulthood, and there would still be more and more things to tell. Besides myself, I could tell about my friends, my people, the celestial body on which I lived, and even the universe surrounding it. I could tell about the variedness of my world and about its strange natural laws, and if you took your notes to the experts here, they could not find a single inconsistency in them. Could an injury or a sickness give me all this?"

Garland's predicament was undoubtedly further added by the fact that such mental disorders as confabulation were rare among people of accurate memory. If what I told had shocked her, she at least did not let it show outwards.

"Your name and past are to me what you tell them to be," Garland promised. "But now you are much more than a shadow."

"To you I am now more than that. I used to consider myself as a full, material being, and shadows were two-dimensional. Four dimensions were to me something inconceivable and supernatural. Now I am here and four dimensions are part of my ordinary life, somewhat different from my earlier ordinary life, and still occasionally surprising, but already quite familiar. I can see that a three-dimensional shadow on a wall is now flat, but it evokes in me memories of my past world, which refuses to become flat in my mind even if it seems flat to my eyes."

If I did not want to be Shadow, I could naturally tell them that the name of my Biblical namesake Jacob meant one grabbing other's heel or following him behind, but it would require some more explanation, as the listeners here were accustomed with names of more obvious origin.

"When you tell to the children about Shadowland next time, may I join the audience, too?" asked Garland.

"Of course," I replied. "You are welcome any time."

"Thank you!" Garland said and left to go on. "Try the one-rope swing. It is easy to make and fun to use."

"All right!" I replied and grinned at her inadvertent reference to a famous, grim Finnish poem about a single-rope swing.

Following her advice I left to the tree two bands attached to branches, on opposite sides of the tree. I would later add to them some kind of seat plates. The sight of the bands reminded me of a caricature cartoon I had seen once, about the two-rope swing that some designer, lost among details, had similarly attached to the opposite sides of a tree. Here such a swing would have worked, swinging with an elliptic movement around the trunk after a suitable extra sidewise push perpendicularly to the supporting branches.

After work and spending time outdoors it occasionally happened that my brains needed rest but my body still had energy left. I tried to train myself into the local ways of life and begun by learning how to clean while my brains were asleep. My cleaning work was extremely simple: mostly I criss-crossed on the floor on all fours with a rag in my hand and with barely enough wit to turn before hitting a wall or a table. I was like an old-fashioned cleaning robot travelling randomly here and there in a room. Sometimes I woke up for a moment if rinsing the rag was too complicated for my absent mind, or if I fell down moving my limbs too clumsily, or if I ended up in a place that interrupted my working rhythm. My rest was perhaps not as unbroken as that of the native people, but I believed that I will get accustomed to the practice with time. The resting time remaining after cleaning I could then spend by merely lying still.

During the latter half of one of my rest periods it rained. When my brains revived ready to go to work, the rain was already over and the ground was wet. The fog producing the rain had not yet dispersed but veiled the scenery. There was few tens of meters of visibility. The fog was shining white with the skylight illuminating it from above. Clouds drifting high above were rarely seen here, because the movements of heat and humidity in the atmosphere followed laws different from my native world. The weather phenomena were rather local; the water having rained around my home had probably come from the nearest large water system. Actual storms I had never experienced here, but the local, momentary wind vortices could be quite sharp. There was no thunder because there were no electric charges to be carried by atmospheric movements.

One of the most startling weather phenomena was a rare

accumulation of fog clouds that the people here called a rain heap. It began as a fog rain similar to this one that wet the surroundings of my home, but if the temperature of the rain area set and the air contained a large amount of water, the cooling could trigger a fast formation of a thick rain cloud. Under the cloud heap it was rather dark and the rain came pouring down. The exceptional and peculiar impression given by the dark and rainy twilight inspired artists to perpetuate the sight in their works. Another, artistically still more inspiring event could follow the rain when the cloud began to move or disperse and sometimes let the skylight enter its underside through a narrow passage. At such times the illumination under the cloud, with long shadows cast on the scenery, was quite similar to that on Earth when the sun was shining through an opening in the clouds.

A wet woodland did not tempt me to pass through in this world, either, but I managed to go to my office without getting my clothes too wet. There was some gear for rainy weather at my home, provided by Handy and Curl, but I made this trip without using them. In the woods I saw yet new small animals, of a kind becoming active during rainy weather.

In the office there were present Ribbon, Arch, and both of our responsible customer contact agents Clink and Spry. This time my task was to check the calculations Arch had done for a water pipe assembly site; cross-checking was a usual practice with critical calculations. Spry would take the results to the customer before returning home.

Arch and Ribbon were just talking about the water pipe job when I arrived to the office. I could not wish them good morning as this celestial body did not provide us with any mornings, but at least I was able to ask if they had rested well. They let me know they were. Arch returned to her other tasks. Her calculations needing the checking were on the sheet in Ribbon's hand.

When Ribbon turned towards me her live side came to the side of my right hand. Therefore she turned her lateral directions a quarter turn as was customary when people were facing each other like we did. I noticed that her right hand, holding the sheet, ended up to the side of my left hand instead of my right one which would have been closer. I received the sheet and thanked her. I could not help asking her about the turn.

"How do you choose which way you turn?" I asked her. My question once again revealed my ignorance about the most elementary things in human life. Ribbon, who knew about my background, was not surprised at my question.

"It happens all by itself," replied Ribbon. "I was not thinking about which way to turn."

"I have heard somebody claim that there is some difference between the ways to turn."

"It is said that same-handed encountering is related with thoughts of mutuality," pondered Ribbon. "My turning towards you opposite-handed happened probably only to have space to fluently extend our hands to transfer the sheet to you. Had we instead been at that machine over there..."

Prompted by the slight nod of Ribbon's head we took one and a half steps across an open floor area to another table.

"... and wanted to use it together for some reason, we would have turned so that our right hands would have been at the machine."

Ribbon, who had come left hand first to the machine, made now a half-turn in lateral directions. I watched how her face turned around, left side and right side turning to each others' places while her face was all the time directed towards me. Now her right hand had come next to the machine where the left one had been a moment ago, and we could have operated the machine together with our right hands while facing each other.

"Two people in love with each other often end up with hands matching when they meet face to face," Ribbon continued. "It happens by itself, too. There is no need to be concerned about the orientation. The halves of human bodies are rather similar, and facing orientations vary even in similar situations. There is no need to correct the way of facing unless it feels unnatural. If I stood facing you with my live or still side aligned with your right side, it would feel awkward and cause a need to turn even though it would not hinder our discussion."

After Ribbon's explanation I indeed recalled an impression that people often corrected their orientation. Perhaps I did so myself, too, although I did not have any conscious mental image about doing so. I thanked Ribbon for the explanation and went to my workstation. Besides Ribbon's words there lingered in my mind also the rotating flip of the blink of her eyes which could easily steal my attention from the main things if I did not watch myself.

Arch's works were easy to check. Her representation was clear and quick to read, and it was hardly possible to find errors in her calculations. Quite soon I could return the sheet I had examined back to her equipped with a verification marking.

"No errors," I said my customary announcement to her.

"Thank you," replied Arch with similar routine and received the sheet. She forwarded it right away to Spry, the young man in charge of our customer contacts together with Clink.

"Here is a new task for you," said Spry and gave another sheet to my hand. On the sheet there was a machine part resembling a pair of wheels of a cart.

"What is this?" I asked, mostly to speed up the analysis of the task.

"It belongs to a positioning carriage in a machine factory. The hollow shaft should be dimensioned for the given loads."

I returned to my seat to examine the drawing. The part tentatively sketched on the sheet was obviously located at the bottom of the carriage Spry had mentioned, to move and rotate the plate above it here and there. Next to the image there were tables and graphs describing what the part was supposed to sustain. The dimensioning task itself did not seem to be difficult; it could actually have been fit for a school exercise. However, various fatigue margins demanded somewhat more professional attention. Luckily I had already been tutored in the local material technology.

The idea of a shaft in four-dimensional world differs somewhat from the three-dimensional equivalent. The shafts with which I had been formerly familiar were cylindrical parts which rotated around their long axis, or as I had understood rotation more correctly here, along the perpendicular plane. A plane had only two dimensions and so it left two more dimensions idle. Therefore an axis, more specifically a rim axis, did not need to be a line-like bar, but it could also be a two-dimensional rim-like plate to whose edge it was possible to attach an oblong wheel rotating in the plane defined by the shaft. Besides the rim shaft there was another cylindrical shape whose cross-section was a three-dimensional sphere, and the shaft of this type was called a windle shaft. It was a bar narrow in shape, but contrary to the shafts of my native world it, and the windle wheels attached to it, could rotate along many different planes, allowing the pair of wheels to move along curved lines without turning the shaft axis, and even if the wheel-shaft system were of a single, solid piece. The shaft on the sheet in front of me was a hollow windle shaft of this kind, and I had to estimate a suitable thickness for its wall so that it could sustain the torsional strains caused by the startings and stoppings of the load propelled by it.

There was also a third cylindrical shape consisting of two three-dimensional curved surfaces confining each other. Lacking a better word in my mother tongue I had named it a rollet. Similarly to a ball its size was confined to all directions, and accordingly it could not form a shaft, even though it was useful for many other purposes.

The task did not last long. Applying my experience about three-dimensional shafts I calculated the strains at the cross-section. The cross-section was three-dimensional, but deriving expressions for it was not difficult. When also the necessary safety margins were observed and values verified with the calculators, I could take the result to Spry satisfied with a job

well and briskly done.

Spry examined the sheet long. His face became more and more pensive. Finally he asked Arch to help her scrutinize the results.

"Do you find the result strange?" I asked surprised at the attention my calculations had attracted.

"Yes," replied Spry. "I cannot conceive how you calculate the tension at the cross-section."

"The intermediate steps of the calculation are shown there," I guided him.

Also Ribbon passing by became interested about her colleagues gathered around the sheet and followed the case from the edges of her eyes nearby.

"There," said Arch and pointed one of my expressions with her finger. "The tension covers the whole cross-section."

Spry raised his eyes from the sheet.

"Why do you use the whole cross-section?" he asked me.

"Why not?" I asked. "The whole cross-section does take part into the action."

"It does, but not by bearing the load," explained Spry. "Rotation is a two-dimensional event, and the stresses caused by it on the shaft surface are accordingly aligned with the rotational plane. The load is concentrated at certain zones of the windle surface at a time. The resulting difference in the required wall thickness is not overly great, but causes nevertheless the exceeding of the maximum tension level we have guaranteed."

An ice-cold wave flushed through my stomach. Had I really managed to make *so* elementary error?

I knew the answer right away. I had not paused to think the geometry of the problem, because I had solved it relying on my old memory, thinking three-dimensionally. To me, a student of mathematics, my own inadvertence could not have hit a more tender spot.

"There is a suitable formula for this type of shaft in the table already," reminded Spry. "From now on, use it instead. We will finish this calculation."

How I wished that the earth would have swallowed me right away! I returned to my place with my cheeks burning. Ribbon watched me as I walked past her, but she did not say a word.

What may be the heaviest substance of this world? I could at least have compared my feet to lead when I trudged back toward home after work. How much heavier would my next trip back to office be? The habits of my past world followed me at my heels, ready to yank me off my feet at any moment. Could one finally become fully four-dimensional except by being born so?

After coming home I ate a few bites absent-mindedly and went back to the yard to sit on a single-rope swing brooding on gloomy thoughts. I might have sat there even longer, but suddenly I woke up noticing Garland standing in front of me.

"You look gloomy," she stated in her simple and candid manner.

"This world is too unpredictable for me to live in it," I replied. "My lacking ability to see and perceive is like an injury making me clumsy and even dangerous to others. I managed to dimension in my job a shaft to a thickness that would probably have let it break down. The sharp-sightedness of my colleagues saved the customer from the damage.

"You are not the first or the last one who makes a mistake," reminded Garland.

"But only I make mistakes for reasons like this."

"Mistakes are mistakes, whatever their reasons may be. And even if you did not see the same way as others, you nevertheless see better than those who do not see at all. You are one of the people just the way you are."

"I can see that you have decided to get me to a more cheerful mood. Thank you for it. Perhaps it really is more fortunate to find the right people rather than the right tasks."

I sighed a little and took from my pocket a fingertip-sized translucent crystal which I had found earlier on a path. I turned it in my fingers. It was a rather regularly shaped polytope. Its edges formed triangles and the triangles formed triangular pyramids. It had a total of sixteen pyramid-shaped sides. The crystal glistened in many different colours depending on the angle in which light reflected from it.

"Earlier I would not have approached a shape like this in any other way than with calculations and shadow images," I continued. "Now I can see this crystal directly, but do I see it similarly to other people even now? Do I conceive its properties and possibilities? I wish I were still a child, free from the burden of habits, free to learn the way you have learned."

I guess I overestimated my ability to turn the crystal suspending it between my thumb and one of the fingers. The crystal slipped off from my hand and fell on the ground, among gravel, soil, and small stalks of grass emerging here and there. I dropped myself on my feet next to the swing.

"Where did it fall?" I wondered combing the ground around me with my eyes.

"There near you, right side obliquely liveward, a little bit front," guided Garland me pointing with her finger.

"I still cannot see it."

Garland brought her finger closer to the target. The crystal was clearly visible even though it did not quite sparkle against

its background. I just had not yet noticed to look that way in my field of vision spreading into so many directions. I picked the crystal up into my hand.

"Thank you. This is exactly what I meant. Inside this skull of mine, concealed into my four-dimensional brain tissue there lives a three-dimensional being who does not even know how to look at ground."

Garland looked at me considering for a while.

"I have a request for you," she said finally.

"Please tell me."

"Soon we will gather here in the garden to have fun, and I will bring here two friends of mine. Could you join us then and tell us one of the stories that you are telling to the children?"

"Stories about Shadowland? To adults?"

"Exactly. And especially to my friends."

Why not? My native planet was a surprisingly abundant treasure chest of stories, especially considering that its volume was to these people zero. I could put my stories into a more adult form and perhaps tell them also other stories besides the wonders of flat geometry.

"Let's try it," I conceded. "We can hardly lose anything doing so."

"We all like to listen to you and we are pleased if you can come. I will tell you when I know more about the time of the gathering."

Garland left to go on with her trip. I put the crystal into my pocket before I would lose it again. For a moment I watched the shining of the stars on the sky, as I often did when I was thinking, and after that I returned back indoors.

I could not help trying my sense of sight. I closed my eyes and threw the crystal I had taken from my pocket like a die on the table. The sound told me that the crystal had stopped on the table-top. I opened my eyes. Locating the crystal took me hardly more than a second. I repeated the experiment and got the same result.

The table-top was featureless enough that the crystal distinguished itself immediately. Among pebbles or grass finding small objects would undoubtedly take a good while even in three-dimensional environment. The experiment I had made on the table did not tell much about the performance of my eyesight, but on the other hand I guessed that even an experiment made outdoors would not reveal anything else but that I would need exercise to match up to the skills of the others. On a three-dimensional ground there was more to scrutinize than on a two-dimensional one.

My trouble to find dropped items was undoubtedly caused by there being so much space into which to diverge. Therefore also sound and light attenuated faster here when they dispersed



into the environment. It depended on the situation whether that was an advantage or a drawback to me.

I already knew that the diverging of light did not affect my ability to see the sources of light: each point in a spot-like, evenly bright light source maintained its original brightness when the light source receded, as well here as in my native world; that fact was not affected by the number of the dimensions. The attenuation of a receding light means in such a case only that the diameter of the light source in my visual field decreases, and if it has more dimensions in which to shrink, the proportion it reserves from my visual field will then diminish faster.

Another matter is to watch a wall which is illuminated by a single light source: the wall grows dim quite quickly when the light source recedes from it. If a room were illuminated from its center, I would probably notice its corners to be darker than I expected, also because the relative distances of a corner point and a wall center would differ more here than in my native world; the diagonal of a room could be about two times longer than even its longest side. The ambient light, however, often evens out the deviations of the illumination, and besides that artificial illumination is not necessary anywhere else than in underground spaces, because skylight is continuously coming in from all windows.

Fatigue let the ponderings about surfaces gradually fade out of my brains, and finally I slid into torpor without noticing it happening. When my thinking picked up again after the rest, I was on my bed. My moving into the bedroom, possibly prompted by the stiffening of my muscles, had happened with so little conscious thought that it was hard to recall any image of the event.

When I was thinking about going to work I remembered my erroneous calculation and horror renewed its grip on me, but driven by the sense of duty I forced myself on my way. However, the way my colleagues met me in the office was the same as usual. They did their business with me as if I had never done any blunder at all. That time my tasks did not include any strength calculations, but I could not guess whether it was a coincidence or if my colleagues wanted to keep sensitive tasks off from my hands.

My confidence in my getting by began to revive when I got a verification marking from Arch on my next industrial calculation sheet. When Song also smiled at me in a very comradely manner during my leave-taking after work, I almost felt myself to be a useful member of the team. The people I left into the office were already others than those being there at my arrival, because my resting cycle had been a little bit slower than that of the others; even Ribbon had returned home soon

after my coming to the office.

Would I be safe? Would the future bring to me so many insuperable tasks that the others would lose their patience? Could I keep my job? I was thinking about my future while I walked through the woods toward my home. I also noticed that I was thinking my employment in my native world's terms which were probably not meaningfully applicable on this world.

Here I was not actually employed; exactly speaking I did not even have an employer to employ me. I had been accepted as a member of a group. The group could possibly get fed up with me and brush me off. Would I be unemployed then? Would I be a jobseeker? Even now I did not have obligation to sit at my workstation except for what impartiality, dependability, and considerateness demanded of me. As long as it did not cause trouble to the others, I could even halve my working time and use the vacant time for some other purpose useful for other people.

Could I be a private entrepreneur? What would entrepreneurship mean in a world where there were no competition or principles of earning? Undoubtedly I could find some need in my environment and begin to satisfy it. There would be work as long as there were needs, and nobody would try to push me out from the market to gain a larger share of the demand. Could I even do whatever pleases me, if I only manage to find suitable recipients for whatever fruit my work happens to produce at the moment? That condition could be more challenging to fulfil than it appeared, because the local people were rather self-sufficient and serving their needs themselves.

Garland dropped in to tell me that the gathering of the house people would be arranged about at the same time that I would normally return home from my next working session. The notice was not very long considering that I had a presentation to prepare for the gathering, but we both knew that I already had enough routine to tell stories to audiences. It was merely a matter of how I should put my words. While we were sitting at the table sipping hot drinks Garland told me about the people of the house and her friends who would come to the gathering with her. Her friends were students of mathematics and natural sciences, and they were also doing work related with those fields besides their studies, or perhaps as a part of their studies. However, the other people who would listen to me would not be scientists which meant that I would have to prepare my presentation considering both kinds of listeners.

After Garland had left I remained at the table thinking about the stories I would tell. I could tell them about my own life like I told to the children, underlining the differences of technical methods and conventions at suitable points of the

story. I could also tell them an abridged version about the adventures of Abbott's two-dimensional square in three-dimensional world. Occasionally there was a devil whispering into my ear, urging me to cook up a five-dimensional story for my audience, but the memory of my own ordeal was still fresh enough that I repelled the temptation.

After I had created what I believed to be a working presentation, I could release myself into lighter activities, trusting that my scrupulous memory would preserve my plan without the aid of notes on a paper. I took a borrowed belletristic piece of literature, reinforced with backing board, out from the book box and lay down on the bed in the bedroom to read it. I was not sure whether I should have called the text poetry or prose; the expression of the author was artistic and soared in dimensions into which colloquial language rarely reached. Could I, too, learn to write lyrically in my new vernacular language?

I kept reading until my grip on the text began to loosen. Then I put the book on the table and let my brains sink into rest and to repeat the sentences I had read, free from obligation to conceive.

## 6

"Such is life in three-dimensional world," I concluded my story with its many meandering by-plots.

Around the garden table there were about all the occupants of our building and the two young men, Spark and Find, who had come with Garland. Find told he had got his name from his childhood habit to bring all kinds of things home for others to marvel, and Spark got his from his pendant twinkling with sparks.

"This was a very memorable experience," said Find. "I cannot remember ever hearing a story like this."

I was not surprised about the feedback. My story had undoubtedly had the taste of personal experience which had caught the attention of the rest of the audience, too. However, I wonder what the astronomers of my past would have said hearing me testify that the Earth, after all, was flat.

"You told us that the orbits of the three-dimensional world are stable," said Spark. "What happens if the central star you mentioned radiates its mass into outer space, as you also mentioned?"

"In practice stable is not eternally stable even in three dimensions," I replied. "The orbits will last and be reliable long enough, though, that people can consider them to be stable for their own purposes. However, in a complex system even drastic changes are occasionally possible."

"Would you like to tell about these things to a wider audience, too?" suggested Find. "It crossed my mind that your stories could be profitable for the students and scientists of our own field, for younger to support their studies and for older as an example of a fruitful way to explain things to the younger."

Garland's eyes were shining. Her intention was clearly coming true.

"Well, well," I hesitated. "It can hardly be fruitful to step in front of scientists of great learning to give a presentation with the topic 'Stories from Shadowland'."

"The presentation can, of course, be titled as 'Perspectives to Mathematical Properties of Force Systems With The Particular Case of Reduction to Three Dimensions'," Find remarked.

"I hope you are not overestimating my skills in physics."

"You would not need to construct your presentation alone. We will cooperate with you and you would get other support from the institutes of the field, too."

"It is worthwhile," assured one of the fathers of the families

in the house. "Our child is now studying with with an entirely new enthusiasm after hearing your stories. I believe that also more grown-up students would be inspired in the same way."

The challenge felt quite exacting. On the other hand, if my chance to compensate my quotidian bread in the design office dreid up later in the future, I would rather continue my working as a mathematician than a storyteller. In that sense gaining experience and being introduced to people of the discipline surely would not hurt.

"All right," I replied finally. "Let us see what I can put together, and if the results look encouraging, we can develop a public presentation from it."

"Great!" said Find delighted. "We can consider it tentatively agreed, then. We will contact you as soon as we have something to tell about the arrangements."

Find and Spak gave the word to others who wanted to know how it is possible to get lost into a three-dimensional forest or how can one fit anything else into a three-dimensional apartment after the enormous bookcase has been put into its place.

"Now your abilities will come out," promised Garland smiling and sipped fruit-based drink from her glass. The drinking vessel was shaped rather for festive than ordinary use, but the mathematics of capacity had destined it to resemble in size a large mug rather than a glass.

"Behind every clumsy deliverer of speeches there is a woman," I replied. Garland seemed to notice the gratitude in my words, but she was still perplexed by them.

"It is merely an idiom from Shadowland," I explained to her.

Except for two playing children we all were sitting at the same table, as was so easily possible in this world. We could find without problems a place for our snacks and my drawings on a few sheets of paper that I have used to illustrate my stories and which the others were now examining together.

"Where did you get this idea about Shadowland?" asked one of the mothers with her child next to her.

"I have had plenty of time and excellent chances to live my role with them," I replied again with a half-truth skating over the difficulties. "They have been another life for me."

I believe even Garland could scarcely have fully taken my word about my origin which must be impossible by every yardstick. If I kept convincing others that I had been a shadow, I might get the title of the village idiot and with it a license to say whatever pleased me, but would that be a honest solution, either?

The chatting of the others followed its own paths after my stories, but now and then somebody stopped to ask me how the shadows would act in different situations coming up in the

discussion. Some of my suggestions like a snow cannon or lottery for money prizes amused them, while others like a pocket calculator or a compass caused speechless wondering. Most of all I wanted to tell the others about some useful invention they had not yet found. Find and Spark had already heard about transformer and been delighted with the idea, but regrettably it was not possible to construct transformers in this world, at least not in any manner familiar to me.

After the gathering the rest of my brains was not fully continuous, as I got kindled to ponder the shape of my presentation now and then. The presentation would require some preparatory work to get the contents to satisfy the audience. I did not know exactly how extensive the learning of the local people was, but I preferred to think about them as an academic audience, and knowing their good memory it would be safer to err into an advanced rather than an elementary direction.

I had two working sessions into the office before the communication device on my table gave an alarm and I got the latest news from Find. He had arranged me the chance for the presentation and plenty of time for collaboration with his companions before that. I also learned that the presentation had been appointed to be given in the auditorium of the center of studies and research in Narrow Bay. The name of the place did not tell me anything but that it was not located in the nearest regions, but Find had already got a ride for me. My office I could naturally leave just by negotiating the working arrangements with my colleagues: when there was less of staff available, work was just done at a slower pace.

Within a car ride from my home, closer to the population centers there was a rather large library, as I called it. I could not decide whether I should call it a library, duplicating office, or a book shop. Not even nearly all of the material obtained there was supposed to be returned, and copying machines were busy with use.

The library was a largish stone building. As a library it was not large as much by its shelf meters as by the number of its users. The books were available on spaciouly placed archiving stands so that everyone could find and examine them. The amount of empty space and the bustling of the multitude made the atmosphere of the hall resemble a large railway station. I copied for myself mathematical works which I believed to be helpful for writing the presentation. My burden did not become heavy, as it consisted just of a few sheets of paper rolled up.

In the library I also found a globe. Together with its pedestal the globe was slightly over one meter high. Because the globe had to be turnable in all necessary positions, it was not fixed to any bearings or other devices limiting its rotation.

It was sitting on a ramifying support shaped like claws of a bird. The inner surface of the support was coated with a material strongly repelling the sleek surface of the globe. Even though the globe was rather heavy, it was possible to turn it with patient movement of fingers, because it had no perceptible friction against its support.

I turned the globe and viewed the land areas, seas, cities, and place markers depicted on its surface. The fast and slow pole circles had been drawn on the surface each in its own colour. The latitudes surrounded the fast circle like inner tubes of a bicycle, progressively fatter as they formed layers covering each other. As they receded from the circle layer by layer they simultaneously converged towards the slow pole circle perpendicular to the fast one, separated from it by an arch of 90 degrees. There were also two perpendicularly crossing sets of longitudes: others diverged from a pole circle like blades of a water mill and arched to the opposite circle becoming a stack skewered by the circle. The other set of longitudes did the same diverging from the opposite circle. The common zero point of the longitudes was Stake, a small shining obelisk at the outskirts of a certain small town. At the top of Stake there was a marker used for measurements. It was not necessary to define the latitudes with a marker, as they were defined by the rotational planes of the celestial body.

Due to the latitudes and longitudes drawn on the globe I could now tell that my home district, belonging to the region of Six Forest Lowlands, was located at the coordinates of 25 degrees of fast-based latitude, 32 degrees of fastwise longitude, and 15 degrees of slowwise longitude. Besides my home I also found soon Narrow Bay on the map. It was a few hundreds of kilometers fastwise and a little bit fastward from where I lived. The place of my coming presentation was not in an actually urban area, but the region was nevertheless much more densely populated than that around my home. The bay was wide into one lateral direction but narrow as a fiord into the other one, and it led into the wide water area known by the name of Lesser Fast Sea.

The celestial body had not been divided into countries. Some wide areas had a name but no borders, because they were interspersed with land that did not belong to any of the named areas. The nomenclature seemed uniform all over the globe, as if the language were the same everywhere. I remembered hearing, though, that there was at least dialect-level variance in the language.

Continuing my adventure on the surface of the globe I found the city of Mountain Coast from which a considerable number of artists had begun their way to the world. Near the slow pole circle there was Port of Abundance, a city producing

a significant part of the food cultivated in sea. And further away, almost on the other side of our world seen from my home there was the greatest of the cities, Land of Makers. Its population, 120 thousand millions — fifteen times the entire population of my native world — I supposed to be sufficient for any need that could ever be expected from any city. Actually I did not know if "city" was any longer the right word to describe that deluge of buildings that spread on and on far beyond the horizon into all of the numerous directions. It had no administrative structures familiar from the cities of Earth, because conurbations of that size could work only if its parts had enough self-discipline to control themselves and cooperate with its neighbours. Land of Makers had already proven to be capable of that. It was a center whose skills were an observed example everywhere else.

After waking up from the enchantment of the globe I continued my introduction to the library. I walked among the crowd wandering to all directions, as if on a market square of knowledge and education, mainly to satisfy my curiosity, because I had already got all the material I needed. Besides nonfiction there were also many stands of belletristic literature, to which I ought to introduce myself by time, because my conception of the local culture undoubtedly had plenty of room for improvement. For the small part I had seen the literature of these people, its themes would have felt home even in my native world: who were we, what did we want from the life, what did we want to become? Love and death were also present in the literature, although not with as vigorous strokes as in the cultures of my past life. These people were restrained and disciplined by their nature, but they, too, had strong willpower and emotions under their calm exterior.

As I was leaving the library I passed by one more stand dedicated to mathematics and cast a curious look at the adornment hanging from the ceiling, the model of a 600-sided regular solid assembled from thin rods. It was the most impressive of the regular solids of this world; its network of triangular shapes contained unbelievable amount of symmetries of different kinds. The mathematicians of my three-dimensional home world certainly knew the solid, but I would rather have let them and others see it from the same perspective that was possible for me here.

Getting a car ride was quite easy in this world; usually it was not even necessary to ask for it. It was enough to begin walking along the roadside, and sooner or later some of the drivers would stop the car and offer the pedestrian a ride. I was picked up by a mother of a family only after a few minutes of walking. There was room for eight passengers besides the driver, but on the plane of rear seats there was only one more



passenger besides me, the drowsy child of the mother. In the beginning of our trip the mother chatted with me a little to become acquainted, but the rest of the trip we rode mostly in silence.

The car was a full-width model, designed for three abreast to both lateral directions. The seating configuration was typical: the driver was in front alone and the eight passengers on the rear seats. In the middle of the square, behind the driver there was no seat but a small common space for keeping items. The solution was practical also because nobody needed to sit in the middle, warmed by nine surrounding bodies in a climate that was warm enough to begin with. For those who were not afraid of warmth and burdened with too much luggage there were more slender car models, for two abreast in both directions.

I viewed the scenery on all four sides. The settlement was rather sparse and altered with woods and open grasslands. The rural appearance of the sparsely inhabited environment created an amusing contrast to the dumbfounding population figures in the statistics. Some traffic arose even from the outlying areas into the road network, however. There were travellers more hurried than us frequently sweeping past our car.

I still had a kilometer left to walk when I thanked the driver and stepped out of the car, leaving it turning into a side-road. I continued my trip walking apart enough from the road to avoid inviting others to offer me a ride, watching the stars and thin wisps of space gases casting skylight on the scenery while I walked. I already knew some of the light-emitting formations of the sky by their appearance, even though I had made no effort to familiarize myself with them and their names. Some of the constellations of the celestial lights would disperse and make room for new ones during my lifetime, some others would remain recognizable even to the later generations.

Did I feel home already? It would be quite a step forward compared to the paralyzing helplessness that I had felt during the first phases of my presence here.

After coming home I moved a table next to the sofa and set myself on the sofa in a posture where I could rest my body as well as possible while my head and right hand would work with my coming presentation. The soft immobility creeping into my body told me soon that I had succeeded in my attempt to divide my body into dormant and alert half. I also released parts of my brains to rest and worked in a trance-like state, in which my world of thoughts consisted of mathematics and written expression. In this world concentrating was easy, if the preparations for it had succeeded well.

I think I progressed well. When the ride Find had promised me was about to arrive, I woke up my body well rested in my

work, washed myself and ate a simple meal. When the car came to my home building, I was already out waiting for it with a bundle of equipment with me.

Spark was driving and Find opened a door for me from a rear seat welcoming me into their company. We took off for Narrow Bay. On our way we chatted about all kinds of things coming to our minds, but my companions avoided mathematical topics and thus gave me an occasion to give the calculating parts of my brains a well-earned rest.

The bottom of Narrow Bay was a beautiful and pleasant region. The coast area in which we arrived could have passed for a holiday destination of my native world. There was open beach at the waterside, rocky hillsides, stylish buildings, and the typical vegetation of the region. The dominating tree-like plant type had a stub of a trunk reaching the height of waist letting out from its top a bunch of large leaves arching above our heads like a fountain. I would rather have called the intense colour of the leaves green, but as it continuously happened here, the colour did not evoke in me any memory of greenness of my past world in spite of all of its vivid expressivity.

The center of studies and research was a scattered collection of schools and institutes spreading into the environment. In one of the buildings belonging to it there was a large auditorium. By its diameter the auditorium was not larger than three-dimensional auditoria, but for the geometrical reasons already familiar to me it could take a multiple amount of audience. I stepped together with Spark and Find in through one of the side doors of the building. Find, who obviously knew the building already led us along its corridors on whose wall slabs there were meandering most fantastic wisps that nature had created in the material.

We arrived into some kind of spacious workroom. There were more than ten people present, but Find picked among them four men who had been waiting for us.

"Here are Mild, Curious, Pensive, and Vigilant," introduced Find the men to me.

Only Snow White was still missing.

"And you must be Shadow, then?" guessed Curious. "We are pleased that you could come."

"Find told me about your impressive story in your garden," added Vigilant. "You have an interesting perspective to things."

"It is by his initiative that I am here," I replied. "Or rather the initiative of his friend Garland. I made the skeleton of my presentation basing it on Find's suggestion."

"Could we look at it at the table?" suggested Curious.

And so we did. Mild brought snacks to all of us to the table. I had spread my notes on two sheets and put down a few

thoughts on a third one, even though meticulously written everything would have fit on a single sheet, too.

"Perhaps Find told already that we can produce here illustrative material and other aids before the presentation. You are encouraged to utilize the resources of the center to obtain and carry out everything necessary."

This was the local way to deliver authorization for procurements. I understood that I had got a grant for my use in this economy where money was not known.

"Thank you," I replied. "For its contents my presentation does not rely on more powerful illustration methods than graphs, but I will make also other kinds of models with pleasure, if you advise me about what our audience wants to see."

"Perhaps these notes will suggest suitable methods to us," said Curious and went on examining the papers.

"What are these?" asked Mild pointing at the reference words I had written at the edge of the paper in Finnish language. "I do not know this notation."

"They are just my own way to make notes," I explained briefly. "Everything that matters has been written in clear text."

The apprehension of an embarrassing calculation error flickered through my stomach again even though I believed I had done a reliable job. It was nevertheless better that possible errors were exposed now rather than during the presentation.

My presentation had some neologisms that I had had to shape for things that had no name in the local language. For example, when I told about electromagnetism I did not have the word "electromagnetism" to use for my translation but I had to write about "two-component radiation force". In spite of that the scientists examining my presentation did not seem to stumble on any of my verbal creations which I could probably see as a good sign. Mild formed tentative suggestions for others about how to build a device inside which the triplet force could be made to imitate some of the properties of electromagnetism.

"I think the idea of framing the presentation into a story of three-dimensional world is a good one," remarked Vigilant. "That part could be even more extensive. The audience would enjoy it and would take in also the other things with it more efficiently."

"How large part of a scientific presentation can be used for entertaining the audience?" I asked surprised.

"The entertainment does not substitute any part of the presentation but complements it," explained Vigilant. "It is favorable to have the audience in a cheerful mood. I can remember one lecturer providing even snacks."

"To tens of thousands?"

"Not exactly," said Mild. "If you are planning that kind of serving to this audience, it is better to save it to the subsequent discussion, where there may remain few tens or perhaps two hundred people depending on the topic."

Sly ideas began to stir in my mind when I heard the generous offer. I put them aside for the time being, because I wanted to get my presentation as complete as possible first.

Pensive had examined my presentation for a good while and began to guide me in the conventional ways to draw three-dimensional diagrams. Until now I had drawn mainly images pursuing artistic aspects, and the subtleties of scientific drawing had got left resting on improvisation. I got an effective course in, for example, representing curved two-dimensional surfaces from him.

My presentation tools in front of the audience would be a blackboard and a chalk. Methods based on projecting images on a screen had not been developed here, because the required illumination power would probably have melted the presentation material on the projector. Noody had developed a wall-sized display device, either. Chalk would be sufficient for my needs, though, as it had been sufficient for the three-dimensional mathematicians I knew. In this world, however, "chalk" meant an almost fist-sized many-sided piece whose different parts and shapes were suited for different drawing tasks.

The others were making plans for devices which I could use to illustrate my presentation. The work progressed rapidly and it seemed that we would even be left with leisure time. Should I explore the surroundings already before the presentation? Or perhaps I, too, could find time to take part in developing something interesting to show to the audience?

When our working session was over, we went together to eat in the dining hall of the building, and after that Find and Curious took me to the apartment in which I would live during my stay in Narrow Bay. The apartment was part of a complex which could be named best as a two-way row house. My own quarters resembled a hotel room, because it had only one actual room. On the other hand, the room was quite large for a hotel room, almost four meters in diameter, in one of the directions even more than that.

For my next resting I did not use my room, but sat on the beach leaning on a large rock and listening to the sound of the waves. I was resting both my brains and body at the same time. The roar of the sea sounded ample and bright with the waves flushing the sand simultaneously in many directions, but on the other hand the steeper attenuation of the sound balanced the abundance of its source. There were no gulls squealing around me, but I noticed a delicately built, long-legged animal

stepping over my legs. The animal looked like a half-meter arachnid, a harvestman, with small fan-shaped pads at the tips of its legs.

Quite a number of stars had glided over my head already when Find and Spark found me on the beach and came to greet me. Suitably rested I decided to wake myself up to honour their presence.

"I think I have got an idea about what we can arrange after the presentation to some of the audience," I told them. "Entertainment in Shadowland style. They have to experience the Finnish feast of *juhannus*."

I knew in advance that my Finnish word would tell nothing to them, but it would be already enough if I could get them enthused about a new and extraordinary form of having fun. The resources of the center would not be taxed too heavily, but from me the carrying out of the idea could demand plenty of preparatory work. I wanted to try nevertheless, because it could be an effective way to make an imprint of the nonexistent into this world.

My friends became inspired with the idea just as I had anticipated. The four other companions of ours were probably assembling the mechanisms needed for the presentation, and it was likely that my role would merely be to give them a suggestion now and then. I could thus put some effort in preparing the entertainment following the presentation.

A Finnish Midsummer feast must have proper kind of food serving, and certainly a sauna, or even several of them. I could erect tent saunas quite quickly if I had suitable canvas and stove stones at my disposal. Creating a plausible serving would require some amount of brainwork, too. I would also have to consider whether the guests would find the result enjoyable, but that I could find out only by trying it. For one reason or another my achievement would be undoubtedly remembered afterwards.

I found my companions working in the workshop of the center as I had thought. We went through the illustrative equipment being in preparation and noticed quite soon that we had a good mutual understanding about what we were trying to construct. My companions willingly released me to enter into the preparations that nobody else could do on my behalf.

I wrote my plan on paper. There was not at all too much time to execute the plan, but I trusted that I could succeed with the help of my friends. The first item to complete would be the sauna. I decided that one tent for each sex would be enough — my understanding about the local modesty with respect to nudity was still somewhat unclear, so I decided to choose for the occasion a solution that I deemed safe. I visited with Find and Spark a library to determine a suitable and readily

available type of stone for our coming stoves. Those moments that we did not spend engrossed in our papers I explained them the Finnish sauna culture and its history. My friends kept nodding understandingly but I was not sure how they conceived what I was telling to them and what they thought about it. I must also reserve some time for testing the sauna: even though the local kind of human body secreted sweat in hot conditions, nature had not necessarily trained them for the same kind of temperature regulating as those in my native world.

The construction materials for the sauna were immediately available, but not exactly at the next door. Find borrowed a car for us. To my surprise he and Spark set themselves on the passenger seats and beckoned me to take the driver's seat.

"I have never driven a car here," I protested.

"You may have to do so several times now, as there is no guarantee that we can find you a driver for each occasion," explained Find. "If you have never driven a car, now is an excellent time to learn it."

Now? In the middle of all the hurry? I guess all nations had a driving culture of their own, and here even an examination was not required of the drivers. I had a griping feeling in my stomach for a moment when I looked at the dashboard waiting for me with the steering wheel, or rather a steering windle. I took a deep breath and sat on the driver's seat.

"We will show you the right route now that we are here with you," promised Find.

I thought that I had already mastered the art of driving watching others driving their cars, but now I had to repeat the details in my mind. The swinging pair of power controlling pedals coupled to opposite movement was similar enough to the accelerator and brake of the cars of Earth that I did not need to fear confusions with them, but the windle shell turning into various directions in its role of a steering device felt frighteningly unsteady, as if I were steering the car with a control stick of an aeroplane. Its rim felt familiar in my hold, though. I kept my both hands carefully holding the windle which was undoubtedly important here where a car could turn along any plane between the three horizontal planes.

Travelling on the road was easy, as the only moment of the driving requiring particular attention was merging in the traffic flow. We arrived at our first destination, a middle-sized storehouse, without causing risk situations, I believe. After getting the materials we turned back and stopped off at a quarry where we got a few burdens of stones. When we came back to our starting place, I already began to feel almost like a motorist.

Erecting a tent was not a completely unknown task to these

people, either. After completing our job with the first two-partition tent near the water's edge we left the erecting of the other tent to the volunteers Spark had recruited for us. The stoves we left empty for the time being and stored them inside the building. We reserved tables and benches and left them besides a wall for later use outdoors. From a forest we got a load of as dry brushwood as possible to heat up our saunas. Find promised to get something more to burn so that we could make a bonfire at the waterside. For a *vihta*, the bunch of twigs for bathing, we had to check many different trees and bushes to find a suitable substitute for birch. Finally we came back with quite a haul of twigs to make bunches.

I also went with Find and Spark to persuade a few musicians to visit our party. We had a short consultation during which we agreed about the programme. I taught them a few Finnish melodies and the ways they were supposed to be accompanied. We did not give an overly detailed description of the occasion, and the musicians did not become more curious than was convenient for us.

We had to act discreetly because it was not possible to arrange a party for the whole audience of the presentation. We would announce the occasion only to the suitably small group that would be lingering in the auditorium after the presentation. Therefore we did not want to display our equipment too openly, either, to keep down the possible rumours about our strange activities. If those left out would want to partake of the wonders of Shadowland, too, we could later ask somewhere else for greater resources to arrange a new occasion for that specific purpose.

We prepared the party with a fervent haste because I knew that I had to dedicate the major part of my own available time to the hardest challenge, the food. What we would eat would probably be the most central and memorable part of the enjoyment, and it was important to make it both pleasing to the local people and faithful to its three-dimensional model. Even though festive dishes originated within the framework of geographical and cultural conditions, they still had properties which were not dictated by necessity but by the will of their inventors. They expressed the spirit of the feast, and that spirit I would try to transfer from a world to another as well as I could.

There were things at which I would inevitably have to make a compromise. I planned to substitute some of the loosely defined dishes, like potato salad, fish, and cake with a local food of similar nature and appearance. For beer and grilled sausage I would fight in earnest. Even though neither of them was a Finnish invention, they had somehow become as the topmost memory of the typical serving of a Finnish

Midsummer feast, so there must be something fundamentally important to the party in them.

I tried on my own first. I made a dough from the meat-like foodstuff I had tasted before, mixing in some products from the vegetable kingdom and wrapping it into a plant-based membrane; there was a plant species protecting its liquid reserves with a membrane which consisted of protein-like building-block molecules of life, and which I therefore assumed to be a suitable skin for the sausage. I lit a small fire outdoors and roasted above it my home-made sausage. The result, however, disappointed me, as the sausage did not taste of anything else but hot meat.

I went to meet Find and explained my problem to him. It took no longer than a moment for Find, already in full speed with our project, to find two competent chemists to whose working place he then took me. He introduced me to both scientists, a man and a woman only slightly older than me; their names were Haze and Star. Find had got exactly the right persons for the task, as they became interested in my project at once.

I described as thoroughly as I could what I meant with sausage and beer, and while I was talking, I also began to realize that the task waiting for me could be even harder than I had guessed. I did not want to give up in any case, and my new companions did not persuade me to change my mind, either.

The core of the problem was the lack of correspondences between my previous and current worlds. In both worlds it was easy to create a foodstuff item superficially looking like a sausage, but for the grilled sausage to be grilled sausage, the substances must be coaxed into cooperation also at the level of atoms and molecules. The Maillard reaction which made the grilled sausages delicious and crispy brown in my previous world either did not exist here at all, or it worked in a way that I had not expected. Find brought us more meat, and we started to think how to turn it into a sausage that would get a beautiful color and a memorable taste when roasted over embers.

We tried with various mixtures of lipoids and proteoids we found in the supply. Each of them changed in its own way when heated over a fire, but the result had usually a strange colour and almost always tasted of something else than I intended. The problem was added by the fact that in my new world it may even be impossible to experience the taste of a grilled sausage, as this world had a chemistry of its own and I had new senses of sight and taste. The only yardstick of similarity were the mental associations that the tastes evoked in me, and that did not appear to me as a very scientific way to reach the desired result.

Finally we decided to add into the sausage two different



preparations. One of them would give the heated sausage a dark colour weighted towards long wavelengths of light, which I bravely decided to call brown. The other preparation would produce a motley collection of aromatic compounds whose tastes formed at least somewhat appetizing combination. I took the role of the guinea pig for our experiments, and the sausages did not cause harmful symptoms at least in me during the time we decided to allot for the effort.

The difficulties we met producing the sausage repeated in yet harder form when we tried to reinvent beer. It had to be invented because there was no drink here that could even remotely be compared with beer. I began with a definition according to which *beer was a fermented drink made of malted grain and yeast and whose characteristics were carbon dioxide forming bubbles and foam, alcohol, the aromatic compounds produced by malting and fermentation, and brownish yellow color*. Regrettably the only concept of the definition recognizable in both worlds was "drink".

There were no alcoholic beverages here. Exactly speaking there was even no alcohol, because alcohol was defined by carbon, hydrogen, and oxygen, which did not exist here. There were corresponding substances for carbon and oxygen, though, and even two candidates for hydrogen. Because alcohol was a simple compound essentially involved with the chemistry of life, I assumed that some equivalent of alcohol molecule would exist here, too.

And it did exist. Haze put in front of me a vial of colourless liquid looking like water. The liquid was also odourless. Haze invited me to taste it. I learned I could drink up even all of the liquid, because the "alcohol" in the vial was merely one of the nutrients appearing in foodstuffs. The liquid was tasteless. It did not burn my mouth or stir me in any other way, either. Nor did it intoxicate me. The longer and shorter variants of the molecule would have the same properties, or the lack of properties.

Naturally there were many different substances in this world affecting the functions of nerves and the consciousness, but after discussing their properties and effects with Haze and Star I decided to refrain from subjecting the guests to medicine-like substances. We would thus have to satisfy with some substance resembling alcohol only by its taste.

Barley did not exist, but after choosing the best available substitute, a seed-producing food plant, we decided to get it sprouted, because we had no time to sprout it ourselves. Finally we got what we wanted by flushing our catch out from a recently sown field. The cultivator found our need quite strange, but my friends convinced him that we were doing important scientific work. The malting ended the same way as

the roasting of the sausage: the heat did not work in the intended way.

After going through a large variety of microbes we had to believe that beer yeast did not exist, either, not even a resembling substitute for it. We added artificially into our preform of a beer some of the local carbon oxide, but we could not make the drink bubble. The taste of the drink was in some sense grain-like, but lacking the fermentation quite thin and flat.

So, lacking time, we resorted to chemical cheating again. Our "beer" finally became a liquid extracted from heated plant seeds, with an addition of two pungent-tasting volatile substances imitating the alcohol, a compound slowly gasifying in water to imitate carbon dioxide, water-soluble proteoid to produce foam, plant colour to produce long-wavelength hue, and miscellaneous flavourings to give fullness to the taste. I was bothered by the fact that my taste which connected erratically with my memories could not make me completely assured about the drink's similitude with beer, but my friends convinced me that the drink was suitable for its purpose, albeit quite a peculiar experience. I bent to believe them, and with effort of mind I could imagine myself drinking my achievement in honour of the Midsummer feast.

Next we wrote detailed directions for the dinner serving and sent to three chemical manufacturing plants an order to produce a sufficient amount of the needed raw materials. When the deliveries would be ready for collecting we would have a team of volunteers to make the food and drink ready just in time for the feast.

Relieved and beaming gratitude into all directions I returned to my quarters and began to concentrate on my coming presentation. I would have to rest in all necessary modes before it, as the effort of feast preparations had kept me in full speed almost without pauses; only the distribution of the effort in my body and brains had been varying somewhat.

After resting I would have time to eat, and then it would be the time to face the audience.

The auditorium illuminated by skylight was not full, not even half-full, but in spite of that there were present a number of people who would in Helsinki have been offered a stadium rather than a lecture hall for their gathering. The audience was rather young, at least younger than middle age, and there were women in as great numbers as men. Among the people there were also some experienced-looking and more aged scientists. The subdued buzz of conversation, soothing in its abundance, abated when I walked into the middle of the stage.

"This is a presentation of the theme 'Specific Features of Natural Forces And Phenomena in an Environment Limited to Three Dimensions'," I said the plain and businesslike opening words, because it had appeared to me that it was not customary here to begin with "ladies and gentlemen". An invisible equipment amplified my voice. I do not know how it captured my voice, as I had no microphone with me. Even the remaining whispering died away and people's eyes were fixed on me.

"As you surely have heard said, sometimes less is more," I continued. "My aim is to highlight phenomena and methods which exist exactly because they are used in a limited space, like on a surface or in a narrow gap. Some of the methods may already be familiar to you, at least from the practice, some others may be useful in a new way if applied on a suitable target.

"I have been educated in an environment very different from yours. I have grown up seeing my environment from a different angle and acting in it on different conditions. Therefore you should not be surprised if my way to present my topic is different from what is customary to you, because what I present here is closer to a story than a lecture.

"Let us think about a world where the impossible is possible, a world where three dimensions support the same conditions of autonomously happening events and phenomena as the four dimensions do here. What kinds of natural phenomena are there in a three-dimensional world? What kind of form would three-dimensional life acquire?

"There is the world of small scale which must inevitably be different from what exists here. There is the cosmic scale, which must also be different as is dictated by the natural forces. And yet, between these two extremities there are many different possibilities and ways how they can meet each other in the middle. Those possibilities can form a world which

resembles four-dimensional world in astonishingly many ways.”

I made a brief pause. The audience watched me in complete silence. Just as in a Finnish lecture hall, also here it was hard to see what the audience was thinking about what I said. At least nobody seemed strikingly uneasy. I had strangely contradictory feeling: I felt unconstrained being finally able to talk to my audience about what I was, and yet I had to weigh my every word before saying it aloud.

I described the three-dimensional atom. Already when I started to speak I regretted by myself that the science of my native world had not yet learned the deepest secrets of the elementary particles and did not therefore lend me an exhaustive reasoning to convince my audience that a three-dimensional atom could actually exist. I described the nuclear particles and electrons, and the ways they affected each other and exchanged energies with each other. I described radiation and wrote Maxwell's equations on the blackboard using the local notation. I gave examples about how atoms can form molecules and structures having abilities and properties similar to those of four-dimensional molecules. I explained how electricity works and chose from the table a device assembled into a largish transparent casing, and used it to show to the spectators how three-dimensional magnets, inductors, and electric motors worked. There was no real electromagnetism inside the devices, but the imitation worked in an illustrative enough manner to demonstrate what I meant with my words.

Even though I had not been listening exactly every word of the lectures of my university, my subconscious mind had obviously been more alert than my consciousness, and when I had been writing my presentation I had managed to pick out from the depths of my old memory plenty of book learning I thought I had already forgotten. Relying on it I could now lead my adventure from a scale to another and tell about Kepler's, Newton's, and a little bit of Einstein's works, too. When I returned from space back to matters on earth, I could talk more about mathematics which was to me somewhat more familiar field than physics.

Moving from topic to another I could pick from the table every time a new device that my helpers had assembled for me without sparing their trouble. I walked here and there in front of the audience to let everyone see as easily as possible what I had for showing. Luckily the people had settled themselves mostly to the foremost part of the seating. In the auditoria of my past world it was sufficient to walk left and right, but here I had to criss-cross into various directions to get in front of all the people.

My own clumsiness proved to be a bonanza of examples;

by its virtue I knew to tell the audience about tying knots to ropes and many other mathematical surprises in my ordinary life. My mentioning of the experiences of crampedness and spaciousness may have even amused the listeners: how can one feel any spaciousness in a world squeezed flat as a foil?

I hung up pictures I had drawn on large sheets. Among them there was a picture of myself, my previous three-dimensional face looking how I remembered it and could draw from my memory. To the spectators the drawing was rather like a hollow silhouette, left empty inside, because I decided to spare the audience from seeing the internals of my head. I drew a Finnish countryside scenery which probably was to these people rather like a thin strip slashed off from a four-dimensional view. How pleased I would have been to be able to paint a sunset for them! I could not, however, choose colours that would have properly described it, and even if I could have chosen suitable equivalents, what would the result have told to the spectators whose world of conceptions did not include an evening sky? Had my audience been three-dimensional, could I have described to it with any better success the difference of the stirringly and soothingly sheened colours which could be perceived only with eyes discerning the handedness of the triplet force? I did explain what happens to sunlight when it penetrates the atmosphere of my native world, but the Rayleigh's scattering equation I wrote on the blackboard may not have conveyed all the romantic nuances of a sunset.

I passingly touched on the topics of multinational organizations, states, international politics, and history of cultures, even though their connection to the title of my presentation was, even putting it nicely, rather loose. I pondered how far the geometry of space might define the habits of its inhabitants to form societies. It was possible that the local thought of "not through but around", inspired by the numerous open directions, had its effect on the ways of individuals and groups to meet the challenges they caused to each other.

The portion of the presentation I had written on the paper was coming to its end and the blackboard was full of formulae and graphs. Having got going I could not help talking some more, and I think I saw at least some pairs of eyes shining with enthusiasm and interest among the audience.

"It has been illuminating to me to notice how the matters separating subspaces can also unite them," I began to conclude my prolonging presentation. "Many natural laws can be presented in a form which is valid regardless of the number of dimensions, or which at least has use in more than one space. Generalized laws can give us new views on the underlying properties of nature. There are also many phenomena which are not dependent of the geometry of space.

"Hearing works the same way where there are gas-like substances and an organ that reacts to changes of pressure. In this world we can play as well three-dimensional as four-dimensional music. Serial processes in general work in all kinds of spaces where there are time and mechanisms to create and use processes.

"In his mind a human being is free to create and to live in the framework of what he has created. We are four-dimensional but our thoughts can have as many dimensions as we want or bother to think. Societies are not just atoms and energy, but also thoughts, and even though they have been designed according to the models given by nature, it may be possible to create them following more than one kind of models.

"Wisdom, justice, or love are not bound to the geometry of space, and if the geometry of the space changes, they are easy to recognize also in their new environment. Seen against that background the structure of the space is not the basic premise governing everything, but rather one of the media by which the human reality obtains its form.

"Some of you may know, or still see by your own eyes, that I have joined this society handicapped, spatially handicapped, so to say. My relationship with three dimensions is an innate part of me. That I can act in four-dimensional space is the achievement of my tireless therapists and instructors. Even though my handicap has been a limitation to me, it has also given me new ways to see the world. Some of those ways I have now hopefully managed to convey to you, too.

"My presentation ends here. I thank you all for coming here and listening to my stories."

It was not a custom of this world to reward public performances with an applause, but the leaving spectators could thank the performers either verbally or over a distance with a clearly visible gesture of hand which depended on the kind of the performance. Two people thanked me with a palm set on the live side of their chests for the stimulation they got from my presentation, and a number of other people with their palm on the live side temple for its information content.

Garland appeared in front of me.

"You are here, too?" I greeted her surprised. "You travelled a long way."

"I wanted to hear your presentation," replied Garland smiling. "I think it was good to let a large audience to hear your thoughts. This way they will yield more fruit."

"The credit of that fruit belongs then to you and the others. But it was great that we met each other now. If you are not in a hurry to return home I request that you stay a little while longer in the area of the center. I have something more to show to

you.”

”It suits me quite well,” decided Garland. ”What are you going to do next?”

”I go to meet Find and Spark. They are already waiting for me, because we have one more event to arrange. How about going with me to meet them? We still have the discussion left to do here, but after that I can leave.”

”Can I stay here to listen?” asked Garland.

”Of course. You are welcome.”

Garland meandered to one of the front seats passing through the crowd wandering towards the exits.

Our estimate had been quite accurate. There were few tens of people left in the auditorium. Their questions were similar to those in the earlier gatherings I had attended, but here they were mathematically more challenging. How does a featureless elementary particle get its magnetic moment? What defines radioactivity? How is the third theorem of Cheerful of Flat Land Village solved in three dimensions? How is it possible to get a lamp to every place darkened by a night? Why should business be done with the aid of companies?

Many of the inquiries were done for the desire to learn more about mathematics, but some people may have been there for the enjoyment of listening to a peculiar fantasy. When the highest flow of the questions began to be over, I finally revealed my plan to the people present and invited them to join the feast. Except for a few busy people they all agreed to come.

When I and Garland came to the site of the feast, a patch of seashore a short distance away from the center, the preparations arranged by Find and Spark were in full speed, for some parts even completed already. I went to examine the tent saunas decorated with twigs, to greet the musicians, and to check the bonfire ready to be lit and the serving under a cover protecting it from nature. Then I returned to give my heartfelt thanks to my resourceful friends.

”Now we just wait for the guests to come,” stated Spark.

”Some of the people here may already be guests,” surmised Find looking at the people having joined the company of the commission.

”The nearest of our guests is here,” I said and pointed at Garland standing next to me.

”Shadowland is showing its substantial presence,” noted Garland looking at the site with a hint of delighted smile at the edge of her mouth.

The guests arrived in a rather short time, many of them prepared for bathing and swimming according to my hint, as I could infer from the bundles they carried. I went to stand next to the tables and with the help of Find and Spark I got their attention.

"Welcome to spend time in a three-dimensional fashion!" I wished in a loud voice. "The geometry of the entertainment is not limited to three dimensions, but the idea is rather to bring three-dimensional culture to a new environment. What you now see around you is the typical way in Shadowland, the world of three-dimensional life, to celebrate *juhannus*, the brightest and fairest *day* of the cosmic cycle called *year*. I suggest that you go first to *sauna* and swim a little, after which we will be suitably refreshed for the events following them. I will tell you more about them after *sauna*. The *sauna* for men is this one here near us, and the *sauna* for women is on the other side of those bushes, and there you will be received by Glint who is fully-fledged and qualified *sauna* guide. Please enjoy yourselves!"

The local people were used to swimming together and in some special cases they also bathed together, but the tent sauna still filled them with timid wondering. They were nevertheless trustful enough to follow my invitation riddled with strange Finnish words. The women left to the direction I indicated for them, and men followed me to the nearer tent whose front part had been separated to serve as a dressing room. In the compartment there were simple boxes and racks for the clothes.

"I am somewhat wondering what is the insight we are supposed to gain by leaving one of the dimensions unused and going then into a tent to bathe," expressed a middle-aged man his doubts among his undressing companions. "This can hardly help us to find practical applications."

"It is still early to expect practical applications," I replied. "And what comes to the insights, they are often personal and not possible to tell in advance. I cannot give them to you ready-made, but perhaps a visit to *sauna* can lead you towards them."

The man looked perplexed at the *vihta* that I handed to him stem first. Finally he received it, as he guessed that I would not otherwise give way.

"Just follow my example," I told him for user's instructions.

The sauna was perfectly heated for my and presumably also others' four-dimensional human bodies. Benches had been brought in to the tent for seating according to my instructions. In the middle of the compartment there was a stove made of metallic cylinder-ended box, probably a part detached from some industrial gas collection system. A narrower tube led from it to the opening at the top of the compartment. There should be no worry about accumulating carbon monoxide, because here incompletely oxidized carbon was not as dangerous as in my native world.

"Sweating in the steam, *löyly*, cleans your skin and your surface blood circulation increases," I explained to them while



I threw a vesselful of water to hiss on the stove stones. The hot and humid wave of air wafting from the stove startled some of the bathers, but I trusted that they would relax beating themselves with the soft twigs according to my example.

"You can give some to your neighbours, too," I advised others and demonstrated the use of *vihta* on the back of a young man next to me. "And if you begin to feel too hot, go to swim a little."

The reactions varied. Some of the people seemed to like sauna, at least as a form of bathing, some were perplexed, and some obviously had made a decision to go through the experience even if only with a persistence matching the Finnish *sisu*.

I did not try to prolong the bathing further than an introductory session. When nearly all of the bathers had reached some degree of perspiration, I led the whole group to swim. Women were engaged in similar activities on their own zone of the beach.

We washed ourselves in a quick and simple manner. Most people had a fresh set of clothing with them, and soon we were ready to go to the tables which my helpers were just preparing for dining. There were two tables, but by the virtue of local geometry quite a lot of people could be seated at them. I explained to the guests that the tables were not meant to be allotted by the people's sex.

The bonfire had been lit already. Its flames rose to a praiseworthy height. A few wondering people from the neighbourhood came to check what thing on the beach had caught fire, but we assured them that the situation was under control.

I and Find raised our glasses of our beer-like drink for a toast to honour the feast and taught the others to say *kippis*. The dining started and to my relief the people were eating with a rather good appetite. As soon as the guests found time from the dining we initiated them into broiling sausages letting them try also their own broiling skills over the embers. The musicians took turns eating while the remaining ones played improvised melodies for common entertainment. To me the most beautiful music was the mixture of buzzing voices and guffaws of the people stimulated to chat together.

When the musicians seemed to be ready for the action, I walked to them between the ends of the tables and asked them to begin their program. They tuned their instruments for a while and began to play a light, rhythmic piece familiar to the locals. I had suggested it as the first piece to get the guests into a suitable mood.

The people who had already finished their dining moved from vacant place to another to hear what the others were

talking about, or wandered in the vicinity of the tables in groups of two or three. Garland had eaten her fill, too, and came to me near the musicians.

"This was delicious," she said slipping the last piece of the four-dimensional descendant of Karelian pie into her mouth. "And uniquely shaped."

"Especially uniquely shaped", I replied laughing.

"You are a very inventive person," said Garland.

"Not me. All this belongs to the culture of Shadowland, or to one of its cultures."

The amused smile I got from Garland for a reply could have been ambiguous, but I did not begin to guess in further detail what kinds of thoughts may have been hidden behind it.

The musicians came to the end of the first piece. After the music had died out I declared in a loud voice the beginning of the midsummer dances. Because the guests undoubtedly did not have any idea what I meant, it was time for me to show them an example. I nodded to the musicians.

On the feast area there began to play a well-rehearsed and expertly arranged version of Summer Night Waltz.

I bowed to Garland and asked: "May I have the pleasure?"

"Of what?" said Garland perplexed. "If you want to perform a dance to us, you do not need to..."

Without giving any theoretical explanations I took Garland by her waist and right hand which was conveniently on the side of my left one.

"I do not know how to do this," said Garland alarmed following my first steps.

"Just follow my steps," I advised. "This has been designed to be easy."

The step pattern of waltz Garland realized in twenty seconds, but the perplexed expression remained on her face to the end of the piece.

"How about trying it yourself?" I invited the others while leading Garland to the table. "The style is free. The dance with a partner between men and women is popular entertainment in my culture."

Only few ventured to dance, but the higher was the number of wondering pairs of eyes following the activity. Partner dances obviously were not part of the local culture, as I had guessed. I showed one more example to others by choosing for my partner a woman looking less amazed than the others.

I had trusted in the connection between music and dance, and it held, even here in the four-dimensional world. There was no actual rush to the dancing space, but the people seemed to understand the applicability of the music to the purpose they saw. The first attempts of the triers were quite groping in the beginning, and their style was indeed free, but little by little

their movement began to flow smoothly with the music. The musicians alternated between Finnish and local pieces, carefully selected for dancing.

"You leave me speechless," said Garland to me sitting on the bench and watching the people familiarizing themselves with dancing. Incredulous and amused expressions followed one another on her face.

"This is admittedly something new and surprising", I said and tried to keep my face straight.

"Why are the pairs chosen to be a man and a woman?"

"It is supposed to encourage becoming acquainted with people of the opposite sex and promote becoming couples. That is actually one of the themes of *juhannus*."

During the dance I had noticed that the male partner needed much keener attention here than in the three-dimensional world: the support his arm gave to his partner was one-sided and unstable; the position of the arm had to be corrected continuously and preferably ahead of the need, if it was intended to be a support. The reason was the same as with my struggling to hang the swing to the tree: there was an additional unrestricted direction.

Any young man who in the ecstasy of the feast would clasp his beloved into his arms to prevent her from fleeing would have to face the same undeniable fact. If the object of his affection would not find his approach proper, she would not need to do anything else but to take a step sidewise, and there would be only emptiness left inside the ring of his arms; it would not be possible to block four sidewise directions with only two arms. Could geometry have an effect even on how the local men understood their power over women?

I had considered teaching also some games to the guests, but they seemed quite well entertained even without. I had twenty pieces of a tree branch readily available in case we would like to try playing *mölkkä* in a four-dimensional environment.

The merry mood of the guests reminded me that the beer ending up without any alcohol was not any particular loss. Actually this feast may have been the first *juhannus* in my life with all the participants stone sober.

All the food found an eager eater. There was still some beer left for any dry throats of the chatters. It came to my mind that because there was no diurnal cycle here and the guests could alternate the modes of their activities, there would be no specific time at which we could expect the feast to end. However, before long the guests had eaten, drunk, and conversed to the fullness of their hearts and began to return home one by one, some of them to the vicinity, some others to more remote districts.

The experience had been quite peculiar to the people, but they thanked the commission in many ways, some still filled with reflective astonishment. On their calmly pensive faces I could read just for what I had been striving: I had managed to touch them with something that was new and unknown to them, but nevertheless in some inexplicable manner human.

Garland remained on the site and helped the organizers to dismantle the tent saunas when the last guests were leaving. One of the stoves we disassembled, the other one we gave to a couple interested in sauna bathing for taking home. We folded the canvases to take them for reuse back to the same place where we had got them. The remaining beer we decided together to give to Find's and Spark's possession. The benches and tables we carried back to where we had borrowed them. Soon the only sign telling about our use of the site were the numerous footprints. There were nearly no trash left behind for us to clean up. After our work became complete we thanked and congratulated each other for a successfully accomplished project and left to our homes or temporary lodgings.

"I thank you also for introducing me to Find and Spark," I said to Garland still standing with me on the yard of the center building. "Actually you should be credited for everything that happened here."

"A single idea is not worth thinking that way," Garland refuted. "We all affect the world each in our own ways, and only rarely we can guess the results of our affecting."

"My therapists joined my body into the activities of this world, my teachers connected my brains into its knowledge, but it was you who joined me to this folk, to be its true member," I specified the reason of my gratitude. "With them and with you I feel being home. Now I no longer feel like a lost alien."

"I suppose you have never been an alien. I have still not understood what and where is the Shadowland where you have spent your youth, but I have always considered you as one of all the people."

"Perhaps that is the real reason of my gratitude," I said. "But now, after all this work, I suggest that we have some rest for both our bodies and our minds. At least I need it. After that I suppose I am ready to return to my home region."

We departed with a goodbye. I returned to my quarters and lay down on the bed. My thinking had begun to grow dim already on my way to the lodgings, and after I got onto my bed they disappeared completely into haze.

I got up from the bed before my drowse was completely over. My brains could bring me to eat, but even eating my meal I still could not claim I was thinking in the full sense of the word. Only when I perked up the irony of fate began to dawn

upon me: my getting rid of mornings did not guarantee my getting rid of morning doziness. I defended myself by convincing myself that the doziness was not a trouble or a problem but one of the normal ways in which brains worked.

I tidied the room after myself and went to thank the provider of the room for borrowing it. Find and Spark were in the research center ready to start the return trip with me. I stood there in the center building corridor with them listening their discussion with two men and one woman. I did not know them but they knew about my presentation and welcomed me back to give new presentations later. When the discussion was over we returned to the same car with which Spark had driven us to the district. Spark did not drive us back, though, but directed me to the driver's seat again.

In spite of the experience I got by the tutelage from my friends I did not find it likely that I would get a car for my own use in the near future, even if it was acceptable. My regularly recurring trips were short and there were many rides available for them. I noticed that in many other households having a car was not a matter of course, either.

After returning to my home region I still had a suitable amount of energy left to go to the office. As soon as I had arrived my work resumed as if I had never been away. Ribbon welcomed me back and put on my desk a sheet where there was for me a task to estimate the expected average temperature of a lightly built hall containing industrial machinery. This time I was particularly alert to notice the steps of calculation where the properties of four-dimensional geometry could be lurking for me.

The calculations were still unfinished when I decided to quit for that time and left, after half of the normal duration of my working sessions. I walked tranquilly through the woods, already familiar but always showing me something new. I followed the familiar road and arrived to the yard of my even more familiar home. I was almost amused to notice my adaptation and assimilation with the society which was as literally from another world as this one. The credit for it undoubtedly belonged to my friends who had, in part inadvertently, joined me to it.

While I fried a pancake made of seed plants, grated vegetables, and a proteoid jelly produced by a plant parasite, I also remembered the things Garland had done to help me, and I decided that next time I returned from work I would make a more festive meal and invite her to dine with me. The meal I made this time I ate alone, slowly, a morsel at a time. I watched out through the window at the trees lining the yard, and at the tops of the trees reaching to meet the stars gradually drifting towards them, and I thought about my past and coming life in

this new world of mine.

A strange wave of feeling of detachment flushed through me. It felt particularly strange now that I had just been savouring my belonging to this world. I should have had no reason to feel like a dry leaf floating on a water teeming with life. I shook my head a little as if a bodily movement could have taken the mental disturbance away with it. The feeling lingered nevertheless at the background of my mind, even though my reasoning did its best to explain it away.

I washed the dishes and cleaned a little. The household chores brought me back to the mental routines of this world, but finally I decided to get out for fresh air, anyway.

I walked to the grassland on the slowwise side of the road and sat on the suitably high stones within it. I emptied my brains of all thoughts I did not want to think at the moment and remained watching the scenery spreading out around me. The weather was fair as usual, and perfectly warm as nearly always. The antifastwise breath of wind waved now and then the tops of the long grasses, but otherwise it was nearly calm. Further away I heard faint rustling, probably caused by small insect-like animals. Occasionally the sighs of cars passing by on the road reached my ears.

Two children were running around my home building, playing some game unknown to me. They reminded me of our storytelling moments which led me to remember the accepting attitude of the local people towards people of different kind. I must be quite a strange appearance with my clumsiness and with my stories almost grotesque in their alienness. Still I was welcomed to the group and people wanted to listen to me. This was in many ways a positive and pleasing world.

After a while also Garland came out. She was about to start walking along the roadside, but then she noticed me, waved to me, and began to walk towards me.

"Are you resting here?" she asked after reaching me.

"Thinking alone," I replied.

"I was going to fetch food when I saw you."

"That reminds me: can you come to my home to dine next time that I return from work?"

"Thank you for the invitation. I will come with pleasure."

Inviting Garland was technically simple now that I knew her alert times to nearly match my own. It was also mentally easy as we felt natural in each others' company.

Garland sat on a stone next to mine, with no hurry to continue her trip.

"The occasion you arranged in Narrow Bay was great," she said. "Are you going to arrange more of them?"

"I can arrange a *Christmas* just for you as soon as the proper amount of time has passed after *juhannus*."

My promise made Garland smile.

"Do you miss Shadowland?" she asked. "There was something in the programme you created that was coming out from somewhere deeper than mere merrymaking."

"Now Shadowland is a mere memory to me. I have no way to return there."

"In Narrow Bay I felt almost like I were visiting it myself."

"Actually that was my intention. I am happy I succeeded at least for your part."

"Have your colleagues got a chance to taste your foods and to listen to your music?"

"No. At least not yet. It is a good idea to keep up cultural activities, though. I feel so home here already that I have to pay attention to doing so."

I had been thinking that the company of Garland would attach me to the surrounding reality, as I felt it was doing. However, new wave of alienness hit me while we were sitting on the stones, and this time it hit harder than before.

I had once in my childhood been playing on a terrace of an abandoned, already ramshackle barn. The floor boards, already splintering into slats had begun to move under my feet, and I got a hurry to reach the stairs before the flimsy floor would give in and I would fall down through it. Now I felt like I myself had been constructed of boards who had begun to move at their joints.

"What is the matter?" asked Garland worried looking at my face with her eyes round. My hands had without me noticing it been groping my stomach as if to check that it still was there.

"There is some kind of disturbance in my consciousness," I explained. "I wonder if I have become too strained giving the presentation. It did not feel overly exhausting when I did it."

I had never been sick in my four-dimensional body, not even exhausted close to the point of dropping down. I did not know what kinds of sicknesses I might get or how being sick would feel in this world.

"You should ask the opinion of an expert about it," suggested Garland. "They can advise you."

"I think you are right. I will return home and contact somebody who knows about it."

"Do you feel strong enough for it?" asked Garland when we got up.

"No worry," I replied. "I am functional and in good strength."

"I will see you to the road," promised Garland.

We began to walk together towards the road. Garland kept a keen eye on me while we walked and as we departed she promised to come to see me at my home later.

There were two physicians examining me at the same time, a man and a woman. I do not know if it was the usual practice, but at least the examination was careful and undoubtedly reliable.

"We cannot find any bodily disorder or disturbance in you," said the male physician Brook.

"You are healthy with all respects that we can detect by the examination," confirmed Sprig. "You do not seem to be in a mentally abnormal state, either, though we would need to familiarize ourselves with you better to draw more certain conclusions about it."

"So I thank you for your examination work," I replied. "I would indeed have been surprised if the reason had been found from my body, but it was nevertheless good to get your attestation about the matter."

We spent a further while discussing healthy ways of life. The advice I got from the physicians were quite familiar to me already from the three-dimensional world and did not seem to require any special changes to my current lifestyle. There were only few vices threatening our bodies and only little reason to exert ourselves too much. I bade the physicians farewell and left the examination room.

Curl was in the anteroom waiting for me. I told her what the physicians had told me.

"In human body there sometimes occur disturbances which are hard or impossible to explain," said Curl. "How about spending a while here with us so we see how your condition develops and perhaps gain more understanding about the matter?"

Curl led me outdoors, to the side of the building.

"Your earlier room is now occupied," she told me and guided me to a spacious veranda. "If you want to rest, I suggest that you use the recliners here. You would scarcely like to stay in your previous room being as fit as you are now.

A rest outdoors? Why not? At least the weather favoured resting outdoors as usual, and the environment was comfortable.

"If you need something, you can find me or one of my colleagues from the nearest rooms," promised Curl. "We may even hear if you call us."

"Thank you. I will let you know if any problems turn up."

"I will call you to eat with us when the food is ready," Curl



said and smiled encouragingly returning back indoors.

I sat on one of the six recliners and remained watching the small park spreading out next to the building and the well-tended meadow-like scenery surrounding it. I recalled past events and entered them into my diary. On the sheet there were already enough text that I might have to continue it on another sheet quite soon.

I had spent on the veranda a while already when Garland appeared. She approached me with somewhat timid steps.

"How do you feel?" she asked and sat on the edge of the next recliner.

"Quite well," I replied. "I am surrounded by caretakers. Did you come all the way just to see me?"

"The way is not long. I was a little startled near our house and wanted to be sure that you do not have an emergency."

"I was examined and found healthy. The reason of my feelings is not known. Moods vary, and perhaps this change was just a normal part of my life."

"Change? Has something changed in your life?"

"No. Not here. My life has been smooth progressing. I have adapted and learned all the time. Lately my life as been very comfortable, fluent, and in a positive way challenging. I enjoy your and the others' company."

"And if nothing has changed here..."

"As you know, I came here from Shadowland. That is a great change, and that change did not happen by my own initiative. I do not even know how it happened and what caused it."

"Does it affect you now?"

"Not directly. Not any longer. But as it has happened once, it can happen again, too."

I closed my eyes for a moment. The feeling was present, right under the surface, like a touch on the shoulder of my inner being. I still did not have any explanation to the matter, but my premonition was growing to a guess and the guess to a certainty.

"How?"

"The time of my departure may have come."

"Where?"

"Away. Away from this world."

Garland's eyes widened a little.

"You are not intending to die, are you?"

"No, I am not. I do not have any intentions for it. I cannot even know if I am talking about death. As I have not been born here, I probably cannot die, either, but as I have arrived, it is possible that similarly I must also leave. It is not up to me to decide any more than dying is."

"Where will you leave? And when?"

"I do not know. Perhaps soon. I cannot say it with any better accuracy."

Garland lowered her eyes. Her fingers were squeezing the hem of her shirt.

"I wish you could reach certainty about the continuing of your life," she said quietly, with a somewhat strained voice.

"Perhaps it will continue, in some form. I do not expect it to end. But from the viewpoint of this world I may be dead if I am not present in it. Therefore I wish that you say goodbye to the people of our house and to my colleagues on my behalf if I cannot do it myself."

"Do not give up!" Garland was again looking at me, asking me with her eyes. "You still have plenty of life to live here. We would miss you so much."

"I will stay if it is within my powers. My home is now here in this world."

"I will ask these people to help you," said Garland and began to get up. I took her by her arm.

"There is no need to do so," I said. "This is not a medical matter, I have already been attested healthy. According to them I am not even mentally unbalanced. This is a mere... thought. Feeling. An understanding caused by something outside me."

"Promise me that you will not give up your life."

"I promise. As far as it is within my powers I will do my best to still stay a long time here with all of you."

Garland needed a while to calm down after what she had heard, and for a good reason, too. I would surely have been just as shocked if Garland had said to me something similar. I nevertheless wanted to be honest to her. It was the least that I owed to her and also the others. Honesty just hurt sometimes.

Garland finally got enough courage to leave me after I had convinced her that my therapists would take good care of me. I saw her off with my eyes, and she glanced behind at me a few times before she disappeared behind the trees.

When I was alone again after Garland's departure I was surprised, too, about what I had said to her. The stirrings inside me, not physical and not actually even mental, but rather stirrings of knowledge and certainty were nevertheless repeating their earlier message to me in yet clearer form.

I had been living in this new world who knows how long, and I still had no idea about how I had come there and how I had become a part of it. How could I exist in this body through which I experienced this world? How had I settled into it and what would happen to it after my departure? Would it die? Would it become a living corpse, without the internal property to make it a human being? Would it vaporize or otherwise disappear, in a way as mysterious as that bringing it into this world, without any knowledge, own or from others, about its

birth. Had it had a previous owner who was now trying to get his property back?

What had happened to my three-dimensional body? Did it still exist or had it disappeared without a trace? Had it transformed into this one that I now occupied?

In my mind there reappeared the image of myself lying unconscious in a hospital bed, dreaming in coma about a four-dimensional world. Were the doctors now getting a hold on my mental functions and calling me back to the real world? *Morning bells are ringing! Ding, dang, dong.*

What should I in such case think about my brains creating from the minimal references from lectures on mathematics a full-size world with all of its minutely detailed sensations, spinning me a story of a new life from work to leisure and back again without a slightest slip in their details, teaching me a vast amount of completely new things, and above all training themselves to perceive and experience in four dimensions? I saw the world around me from a perspective which was not possible to properly imitate even with any kind of computer simulation. I had a four-dimensional sensory image of my body. Would my brains construct within themselves an ability which had no natural reason or motivation and which would exceed all known neurological explanations? Compared to that even a change of shape and a jump into another universe felt easier to believe.

And what would happen after my return? Whatever the truth may have been, the transfer back to the three-dimensional world would again be a new and great crisis in my life. Would I again have to go through Chaos when my brains would be trying to adapt to a different flow of sensory information? What would happen after my senses would clear and I would experience the volume of my world, as I now understood it from my four-dimensional vantage point, being collapsed flat, down to zero? Would I go into the worst fit of claustrophobia in the history of medicine? When I move from three dimensions to four, I get more room; what would follow when the room I am utilizing is taken away?

Could I keep my memory? What of my life in this world would remain? I looked at my diary into which I had recorded my experiences and thoughts. Here it would not give to its readers many things that they did not already know about me, and I could scarcely take it with me. I would still like to leave it behind me as a proof that I had once lived here.

My eyelids felt heavy. It was very peculiar, because the heaviness of eyelids or the need to close eyes did not belong to this world. Muscles got tired or even sore when they needed rest, and thinking became sticky when brains had given all that there was to give for the time, but eyelids would never droop

under the weight of drowsiness. This must be a sign that my departure was nigh.

Once more I viewed the scenery around the building, the spacious terrain spreading out around it into three dimensions and the canopy of the sky full of sparkingly bright stars rising into the fourth one; everything that I now called my home and to which I had already got attached. Farewell, my friends! I rejoiced over your company all of the time and I thank for every moment I shared with you.

I end my diary here. My eyelids, becoming heavier all the time, tell me now that the next time I will open them I will open them in a world where there will once again be only three dimensions.

Unless there will be five.