Starlog

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The semantics of life, earth and body. Existence and spirituality and conscience.

The entanglement of Shevek and Takver compelled his choice. He would go to her. The causality was described by Synchrony and Simultaneity.

To do it he would have to lower his orbit. At her altitude he would need one week to catch up to her, and two more to collect ion.

Until then, his ship would not be able to maintain that orbit independently and the mated station would be loosing altitude.

She said the margins didn't concern her. The plan would work well enough – and if soomething went wrong, at least they were together.

Takver would chat on the navigation data stream. It bothered Shevek. Each message had to be removed from the input to flight control. Each deletion from that glass the loss of a piece of her. It was an unnatural act.

Spirituality has dimensions described by love. The kinds of love are the dimensions of spirituality. It is as vital as air and water, earth and body.

Mascons affect space-time as experienced by Shevek and Takver in their orbit as the quantum foam affects the flight of bosons. Takver's orbit matched the solar - ion power budget to the challenge. Shevek programmed flight control foor the one week rendezvous with Takver, and returned to his work habit.

He shared astro and comms facilities with friends and researchers via interplanetary internet – essentially in a barter exchange for access. He maintained an au-

tonomous system link to the deep space network. Mechanically it was like a trade, but he was just admin. In orbit around earth's moon his clients numbered a dozen including Takver. She was the only human, the others were robots. Three of those were periodic links to the suurface which roamed between the two. The remainder were in high orbits.

Shevek's IPN address space included each major subsystem following the work of Takver to interface NAV and FCTL and observatory instruments. He permitted the observation scheduling subsystem to direct attitude as a slave to FCTL. This kept the instruments busy. While every resource was maximized, and Takver on approach, he was coomfortable at work. He was able to return to his effort to further contribute to science and engineering. He and Takver sspent their deep time working on new techniques and products in molecular fabrication, moefab.

Takver had made significant contributions to realizing the personal space plane before they were married. She and Shevek has first met as young children of four years living next door in a comfortable suburban environment. Shevek had followed her to the city university, annd they had each discovered molefab by following their own interests.

Shevek has followed her work in building a space plane of similar design. The two craft appeared identical. Takver had emphasized the facility of differential propulsion for very low velocity handling and keeping. Extremely smooth atmospheric attitude control.

Shevek had traded some atmospheric handling for velocity. Otherwise both included electromagnetic observatories with very similar instruments. There were some variations in part versions. The system of analog cature and storage also included significant contributions by Takver. Shevek had done work on network interfaces.

Since his first studies in university, Shevek had focused on space-time computing. The simulation of quantum wave functions predicted fabrication techniques for new computers and other molefab products.

Together, Shevek and Takver had entered into the whole of the technology that was changing the means of life on earth. Takver had focused on bringing it home. After graduating she had built a crystalline home in cubic carbon, the base material of molefab. Shevek had taken her example out to sea in sinking his foundation into the submarine floor. These were firsts in a broader sense. Many had contributed to the new found domestic bliss of free power to habitate with the high grace of technological facility. Few, at the time, had lit space planes to their tops. In their homes, Shevek and Takver had found some variation. Shevek's was a sea column. Takver's was a terrestrial oval tower.

The molefab products were natural computers. Molecular devices a thousand or a million times more dense than former microprocessor technologies implemented myriad functions logical and mechanical. The character of cubic carbon was extremely convenient to technological freedom. It possessed many advantages to previous engineering materials. It could be applied to structural,

mechanical, and electromagnetic purposes with extreme performance. It was applied everywhere. It afforded lighter than air facility to space planes, and massively parallel space-time computing.

Shevek's contributions to space time computing included a novel data processing architecture for visualization. Coupled to an analog display, a space time simulation could be slowed to display the process. Naturally, this was a boon to productivity. The research community adopted and adapted the idea. Students fell in love with the obvious allure of a distant future dropped into their laps. Takver and Shevek were in the vanguard of developments understood by proficients of quantum physics. The world was only very slowly waking to the new technology which would change human existence.

Takver had named the real time space plane data stream "Starlog". Shevek had worked on the interactive network interfaces with her. They believed in the utilities small and large. In the small, it was the most efficient solution to an engineering problem that was motivated by their interest in being safe and contributing by sharing what they could. In the large, it was good science, and potentially popular science.

Takver on NAV. "If you shutdown the observatoory you'll save some orbit next week". "So many hours". "I'm brave, not insane. We can add any margin we can find". "Ok, sure. We can.". Shevek picked the observatory shutdown program with an aggressive performance. It notified scheduling members of the calendar change and began its countdown. It would deselect FCTL af-

ter the current job was completed. “Done”. Shevek on NAV. “Cool”.

“Can’t really get my head into working”. “I know what you mean”.

The next morning, home time, Shevek was four days behind Takver. It had been more than a year since he had seen her. Her observatory flight was a reboot. She and Shevek had seen each other almost every day their whole lives. When she finally told him he could come, he asked her to come home. She had not said why he should go to the moon, only that he could. Long ago theiir language resolved to pick up where and when it can, and no sooner.

They had agreed that their relationship was best described as entanglement. They were inseparable in this sense. Spiritually. The theories of Synchrony and Simultaneity described spirituality as dimensions of love having temporal functions. The mechanics were no mystery to Shevek and Takver. These theories described their experience well.

Once he had resolved her intent, he was compelled. His plane would not make that trip gracefully. “If I meet you in that orbit, I’ll be like this”. He had sent the data on NAV where it was convenient to plug into a flight scenario. “That’s fine. Come.”.

She had become brief. Some new art in her moment. One of innumerable reasons he loved her. She would shift her world regularly. It was breathtaking.

As soon as Shevek had reached low earth orbit, Takver trained an optical link on his location. She had

keys to pick up an IPN link when he was visible. “Finally”. Takver on NAV. “I’m committed”. Shevek. He felt the message flow through him. Welcome to space. Our space. Come to me.

Shevek didn’t share Takver’s adoration of space flight. Shevek is a roboticist. He felt like a free electron adrift in the void. He adored earth. He preferred to be able to go out of doors. But he certainly understood it. It was an awesome solitude in beauty, weightless. The technology to fabricate food and water and air and every thing he needed for long term duration twice that necessary to the flight locked up his sense of security and well being.

The couple bound him to the exercise. He knew the look on her face in seeing him would make the trip worth the patience required too quell his sense of freedom.

This was the way to be with her, and that was more important than any other part of his life.

Three days from their rendezvous. “I miss you” was on Shevek’s flight console when he woke up.

Takver had named the space plan “Sagittarius”. It was a dense complex of electro-mechanical devices fit into a winged haack body. A simple atmospheric mode of flight. It had twelve crystalline rings that could be brought on line within the power collection and storage subsystem. Schematically, the fusion rings multiplied the power available from the sun’s radiation by the power available in proton storage. Environmental proton was continuously collected, but most human endeavors shot the heavy products of the crystalline beam rings into space.

"Did you read the news?". Takver. "No". "People died". "How?" "Someone blew a big dam in an area disputed as native". "What are we going to do?". "The violence against humanity group is talking about it". Takver sent the URL on his work station console. Shevek plugged it into his browser and read the statement prepared by Ruggiero and Clarke.

> This latest incident of technological violence offends the community responsible for the methods exploited. It would convert our actions in sharing our knowledge to a crime against humanity. For this reason we reject the socio-political association.

Shevek signed under Takver following the loosely ordered list of working group members.

Shevek's heart was heavy as he stared at the glass. His work on a technique to time interactions and analyze interaction functions was laid out before him. He wasn't making the world a safer place. He was giving power to people defenseless from each other. Takver said they'd work it out, let them be. It was true that they could do little more than continue their own lives unmolested by those who would reach for power over others.

Shevek's analog display held a frozen view of the plasmatic production of cubic carbon, the first most essential molefab process and his default work space. Shevek had sixty thousand hours in that infintessimal space, most of them non visual. The frequency generator output was shown schematically as a two dimensional wave line. A selection editor had colored the

atomic shell with a purple hue. A product schematic showed a sticck figure for the molecular assembly under test, his functional analyzer.

He thought of Takver. The flight console replaced the quantum mechanical work station.

"Working?". "Barely".

Separated by three days, the couple was warming from their former distance. Their moment was evolving rapidly, the NAV link was changing colors.

Takver had been the first to publish the solar cycler path to orbit as a space plane NAV routine. It had been her first flight, a vacation of ten days. Sagittarius afforded a transparent fuselage to the spectacular views. Shevek could have been told to come, but he didn't share her passion for space flight. The experience would be better alone. She worked on her data stream network interfaces and published data and photos and notes to her public namespace on the internet. She had hoped that Shevek would share her interest. She knew it would soak in eventually.

Takver and Shevek knew that comprehension required an input to meet an output. Speaking without comprehension was a relatively desperate act. Of the two, Shevek was the more impatient. He believed more strongly that comprehension could be lifted from words. The female, in contrast to the male, knew that comprehension was a temporal relation to the processes of the body and mind. It was more true for the female than the male, but only by evidence. The couple had no need for nesting themselves. The need of each other was satis-

fied differently in each moment, and the male tended to language more frequently. Takver's grip on her outputs expressed worlds. Shevek was coupled to those worlds.

Shevek. "Thinking about Guise.". "Me too".

Lisa Guise was an anthropologist who studied the primitive homo sapien, the murderer. Children were educated with her ideas for generations since she wrote about original sin as metaphor for the force of fight and frustration within the epigenetic mind.

"I don't understand how we're still dealing with each other with violence.". Shevek. "It's theater of the absurd. It still preys on the pretence that we're beyond or above our genetic origins. Understanding and compassion don't.".

Shevek and Takver had grown up talking about Guise. Relatively recently they reflected on her french name as the human mask. Takver. "That people must take their business from the superficial is alarming. No good comes of it.". Shevek. "Exactly. We need to get back to more assertive action.". Takver. "Theater Positive needs to be more popular than Theater Absurd, and that is hard to do.". Shevek. "We need to find that moment. We need to write.". Takver. "More importantly we need to promote writing and speaking from mind not stomach.".

Takver. "We still live in a materialist society. The hierarchies are more important to stomachs than their heterarchies. They value independence over dependence because they are dominated by want and need problems. Until we get good at that, we'll be like that.".

Takver rolled over and went to sleep. She was exhausted. A welcome feeling she and Shevek had long ago grown semi-addicted to. Satisfaction. She knew that Shevek had forgotten that he had given her keys to everything in all of his systems. And that she used those keys regularly to watch and interact his subconscious at work. She didn't understand why he didn't use her keys to do the same. She didn't care, or thought it was funny, that she had played invisible roles in his work since his visualization work. It kept her warm at night to be as close to him. It didn't matter how.

Shevek ate and went to his upright work station. He collapsed the screen to its minimal dimensions, fifty three centimeters wide. He thought of Takver sleeping.

Shevek's display still had the carbon bonding interaction testing a molecular assembly for differential analysis. The analog image was fuzzy, fermionic waves against black shadows of spatial resolution colored in golden hues of pink and blue. Two dimensional overlays of derived metainformation showed the analog infomathematics. Molecular analog information space lived in a microcosm that included digitisation and fabrication hardware. These interfaced digital and analog subsystems for communication and storage. The balance between analog and digital subsystems met utility to purpose with dimensional completeness. Designed and constructed by a community of users, it was nothing more than a good tool.

The capillary pump concept featured broadly in molefab products. In the walls of the space time com-

puter, capillary devices were sized to a target molecule. At each end a mechanical hatch and an electromagnetic ion field. The wall between the electrodynamic field and the environment maintained a hard vacuum. Its array would shoot ambient molecules and free electrons into the external environment.

The electrodynamic field was a volume of planes supported by structural gridding and integrated with fabrication facilities. The whole or part could be grounded and reconfigured or rebuilt. It was analog and digital subsystems which – ideally – came to life in the intended feature set.

The operation of the capillary tube was a variation on the theme of an electrodynamic accelerator. A magnetic wave was generated by current rings that could trap or accelerate a charged fermion. The idea applied to pumps for many purposes including fusion.

For fusion power, only particles that produced an electrodynamic force on collision were useful to humans. The first of these was boron eleven. With eleven neutrons, boron would collide to produce an electric potential and the fused particle. More recently, work had begun within the greater molefab community on techniques for storing and using energy via anti-matter. The problem was the harmful ionizing gamma energy bosons produced by anti-matter collisions with matter, and converting it into power that was practical for human applications.

Fabrication requires a source and a sensor. A source pipeline pulls, configures, and orients an ion stream re-

liably at a number of gigahertz. At its head it fills volume in a programmed deposition pattern. A sensor is an electrodynamic probe having a single proton at its tip. From some distance it detects and maps a surface or volume for navigation, placement, inspection and any other useful interaction. The sensor tip begins a chain of amplification to the local logic processor.

A broad variety of designes implement the idea. Typically nanobots leashed to a spider which is leashed to a hive, which is connected to a node in the vacuum environment. Each node is up to a thousand times larger than its children, and provides power and placement and signals transmission and current conversions.

Shevek slept in stages. He slept well until he started with a fit. Something to check, or a sound. Was something beeping or whining or chirping or wailing? Nothing. Space flight was soaking into his subconscious, where he worked. It was not agreeing with him. His dreams were rich with unexpected success and newfound avenues of exploration. He could get up and work if the eyes could open. But they could not. He was stuck to the bed, held into it by his body. The bag was horizontal, but his floating body was asleep.

Takver slept with Shevek. Occasionally her sleep was disturbed. Somewhere between consciousness and subconsciousness she put a hand on his chest or back or arm so he could get back to sleep. They dreamed of success and exploration in techniques and devices for whatever tidbit of work and life that floated through their ocean. They lived in a world where work was life

and metaphor until it was life a metaphor for love. Like any dream it was always messy. Coupled in this way, Takver was happy and content. In this way she got as much of him as she liked.

Shevek woke, as usual, with a chest full of emotions. He found his bag wrapped tightly around himself, which was a surprise because he didn't like that – sleeping in a tight bed. He left it out and got himself through the air to the midsection where he would eat. He made a coffee, and sippped it slowly through a straw. His mind registered the coffee. His heart registered Takver sleeping.

Takver felt Shevek at his work station and was lifted from her bed. She rolled over the bag and packed it into its locker over head. She could feel his force diving into his debugging, which was completely different from a real output mode. It was a faucet that had only the slightest flow.

She went to the midsection food production machine and made herself a coffee. In space it was served in a pouch with a drinking straw at one end. It was just as good because someone, somewhere, had perfected the pouch to not affect the experience adversely. Thank you, brother, whoever you are, where ever you are, may your day be as rich as this moment.

She flew to her desk and opened the tabletop to look down on her latest project, Shevek's computer project. She thought she understood the problem it had, and took a look at what Shevek was doing at the moment. He was looking at the electrical wave differential from

the interaction point to the amplifier that fed the analog compiler. No news, there. He's just warming up, rereading yesterday's work.

She lit to the air and landed inverted on the floor of the ceiling, hovering over her midsection garden. It was perfectly healthy and required no manual assistence. She breathed in deeply the fresh green oxygen, like turning on the bedroom lights in the morning.

Shevek felt Takver light up. She was breathing, which of course she always was. It was slightly disturbing, the awareness. The way it came into him from heart. He took a deep breath as he recycled the thought. She was fine, probably in her space plane garden. He had one, too, of course. It provided the final, most important ingredient to their air quality. The air subsystem maintained the molecular features of the air, and the garden reinforced this fact.

He felt her in his work. Her presence lit the colors in his display to their usual hue. At moments like this solutions came from outer space like a gamma ray hit the right spot to make it work, and the analog compiler picked up the change and recorded it.

"Abbo". Takver. "I feel you". Shevek. She referred to his work. He knew.

Abbo had written of the immortal soul as metaphor for the importance and significance of one's state of being, one's spiritual health.

Takver was in her fingers as she laid her hands on the software pipeline for the differential analyzer. The interaction point was a silver atom adjacent to one of

the molecules under test, a hydroxyl. She watched the simulation restart as she nearly wished it so. A photon with infrared energy hit the cloud and shook the hydrogen bond. The wave was absorbed by the sensor and traveled across a mono chain into a feed field that moved another hydrogen within the differential target software system. Success.

Shevek put his hands on the black surface in front of him and pushed his chair back. He pressed his feet down and stretched out his legs. His arms raised over his head – as his heart gloewed with fusion energy.

The new differential analyzer was far more sensitive than the previous version. It would enable the tool chain to offload more manual work – another leap in productivity. Analyzers in higher energy levels were long completed. This would be the first one seen at this energy level.

Digital solid state information was stored in hydrogen proton in the binary code of an electron. These bits were held in a sensor - manipulator cell within a carbon lattice. They were addressed in a physiological three dimensional cell location. The analog software pipeline record of the differential analyzer was a copy that could be destructively read into copy machine and duplicated by the tool chain.

Shevek. "Synchrony". Takver. "Simultaneity". Atro had written that the subconscious at work performed without eyes. Pae had written that the coupled subconscious at work would perform instantaneously.

The principle of spiritual aesthetic is as old as hu-

manity, likewise functional priorities. The interior of Sagittarius was designed for coloring and transparency. Manipulating and programming the interior could employ periodic brainwave information. Shevek and Takver had employed brainwave information in programs that maintained a daily environment. This was enough information for the machine to emulate mind reading with high fidelity.

Takver. “Two days. I’ll run the mating program.”. “Ok”. The flight scenario ended with the two craft three meters apart. The mating program would watch and wait two minutes for the flight program hand over protocol they had elected. A simple buffer for every thing and every one to review every thing. Then it would load the mating procedure into FCTL after a systems review that was more extensive than was convenient in NAV.

Sagittarius employed a mating coupler that had been designed and published as the international standard. Every human ship and craft that originated from earth employed the identical design to enable rescue and aid – to not prevent it – in the void of space. Sagittarius had two, amidships, at the nadir and zenith. The mating program configured the two craft for the deployment operation. It would take some time. The optical link was continuous, having an uninterrupted line of sight. The mating program shared a keychain that was private to Shevek and Takver. Its integrity module would generate an infinite keypad for a simple digital encryption they called foam.

Digital communications employed error correcting

codes and store and forward packet delivery networks on the common buss for IPN systems. Digital packet architecture bounded the comm link requirements with respect to method and bandwidth. The mating program was designed to share the one link needed between the craft, the IPN link. The internetworking architecture maximizes the application of the resource that is most useful – for a bidirectional definition of the term application, both in to and out of link hardware and distribution.

Between the two Sagittarians, the mating program had configured Takver under Shevek's nadir. Takver had the view of the planetoid, and Shevek had deep space over his observatory. It then commenced the opening of mechanical hatches that served as a protective, aerodynamic shell. The two stage airlock could not contain a person, but permitted the outside mating aperture to move. It extended in a two stage pipe roughly a meter in diameter and a half meter from the aerodynamic surface.

The common bond was light emitting as the mating adapters were shown, schematically, deployed. Takver sent aa picocam autonomous spherical space camera droid to watch her own zenith. The silvery, dark surfaces of her craft under the sun were absorbing radiation for power and keeping the interior cool. The droid heated and then cooled as its systems normalized. Shevek saw the synchronous event in its simulated digital image on his display.

Shevek woke and openeded his eyes. Takver had

turned sour. He felt her ascend away. He thought about a fast camera droid that could cut his time to seeing her again. He wanted to see her, and thought the digital link image would be depressing. He wrote to NAV. "Would like to see you". He waited for a reply. None came. The new differential analyzer called his name. He needed a different kind of project to break his stride. Or a nap. The simpler of the two choices won.

Takver turned the floor semi-transparent to have a look at the stowed mating adapter. It was also translucent, and presented a familiar ripple in a small part of the area between her and the planetoid. She would think again about an interior extension that would permit a space walk. She darkened the chamber and took up her work. The design she had would hold one person, sitting, and require three hours depressurization for the suit that Wagner designed. It was a part of her original design for Sagittarius. Because she had a space – interior space – problem, she had decided that she would build it and destroy it when she would use it. She would have Takver, soon. It was time.

She ran the fabrication program. The loss of resources weighed heavily as she elected to have her cake and eat it too. She would have Takver here a minimal amount of time, and took his and the mated stations' expected flight path to where she wanted to go. A slow dip below her ideal orbit. And while outside in the stars.

Wagner's suit maintained high interior pressure by elastic force around the body, hands and feet. A small air pack and helmet provided great comfort for work or

pleasure in space. It included overclothes for degrees of radiation and micrometeorite protection. The breathable air subsystem could recycle with solar radiation collection. Fluids collected and recycled.

Takver and Shevek each had suits on board, just because they're easily stowed and a last link of self defense for the predictable and unpredictable. Takver had hers out and checked. The suit review included power and pressure. Her flight would be a personal first. It was possible for Shevek to fly with her. Not the safety first plan, but practical. "I'm going to space walk, after you get here. Build an airlock and check your suit. You're coming with me.".

Shevek rose from his nap when the work station beeped. He would find her at last.

Shevek found Takver on a space tether. He ran the airlock build program and reviewed his suit. He would follow her into space rather than apply the new differential analyzer to his work station. He would also need a walkway from his zenith to his nadir, and around to Takver's nadir. Something he could pull on. He looked through Sagittarius files and found a plan and program. The program would fabricate and deploy a tether from his zenith to Takver's nadir. He would snap a ring to it and walk himself around. He checkeed the budget against the flight scenario. It was already counted. Takver had counted the airlock and a set of tethers.

Takver pulled the human airlock from the forward temporary build chamber and settled it into place over the nadir portal assembly. Once the interface met, it

screwed itself into place. It implied adaptations needed for getting around, being central to her interior flight corridor.

Shevek felt her satisfaction and the presence that their future space walk held. He reflected on these feelings, and opened a translucent window through the floor from which the planetoid in space could enter his senses directly.

Shevek's view of the lunar surface filled his senses. It was cold by night and hot by day – either of which would kill the unprepared. He folded himself into a seated position and felt his heart beat. He felt Takver with him, there, on that surface. She wanted to meet in space, and she wanted to talk about the surface.

Without an atmosphere, the space plane had no access to the lunar surface. It could not ascend from that altitude in the gravity well.

Shevek considered this. If Takver wanted to descend, they would be talking about how and why. The how was a problem, like any other, that may or may not have an applicable solution. The why concerned him. Takver's presence was not small. He found a place to wait for her.

Takver grabbed Shevek from his rest. Shevek felt the flow of water through his heart and went to his work station. Takver was there, in a design schematic for a cylindrical volume measuring a kilometer in diameter and length. The structure was silicon, not carbon, and was simple and heavy looking in its details. A horizon marked the lunar surface at half the length. The

walls were a meter thick and opaque. Takver. “For the community”. Shevek. “We leave behind a fab bot and collect and sort the details from home”. He watched Takver dive into lunar materials, so he put together a bot bus. A minimum and a maximum for the gross dimension. A launch plan. Airlock grabs maximal diameter. A descent is easy if crashing at high velocity is ok. Maximal impact force, minimal impact velocity. “Wow, that works”. “We can crash it into a mountain”. “Weird”.

Shevek had long ago understood Takver, while his sex slept and he saw that she knew something of it. Her instincts differed from his. That the similarities between male and female were large, and the differences small. And that it would take him a long time to understand the differences which in awareness would figure largely. Understanding this he knew that the issues surrounding the similarities and differences were intelllectual. That fundamentally the male and female were two halves of one being, one person that walks through this life. Both halves are necessary to maturity and development and comprehension. And with one half one was incomplete and not comprehensive.