

Thoughts on a Mars Settlement



by Kalani Chapman

Introduction

Why should humans leave Earth at all? There are many arguments for and against attempting to spread the range of our species beyond the ecosphere of this planet. There were many arguments for and against the planet being spherical in olden days, and they went on, abstract geometric proofs combatting intransigent myths, neither side willing to relent. In the end, someone sailed around the world, and a little more hard evidence was gained. Today we have photos from space to show that the Earth is a ball of blue and white in a vast emptiness, and a host of other inventions that we usually assume have made our lives better. Whether those first sailors were motivated by greed, a sense of adventure, or the desire to win an argument is irrelevant. The fact is they went. And the same will probably happen for Mars.

But let me briefly go over the pros and cons of settling Mars. The arguments against going are largely environmental, economic, and humanitarian. In other words: 1) we shouldn't go because we'll just be trashing another planet; 2) we should solve our societal problems here on Earth before we export them; 3) we shouldn't spend enormous sums to settle another planet when people are still starving here and wars are still being fought.

Another argument against space settlement, put simply and straightforwardly by *Arrested Development* (a rap group), is that "Space ain't Man's final frontier. Man's final frontier is the soul." As the name of the band implies, our culture is stagnating in a backwater, and further expansion, mirroring earlier human expansions on the surface of the globe, is simply regression. What is necessary is a turning inward. This point of view is limited to the fringes of our society, however: the artists, philosophers, mystics and other spiritual people. What it would take to change the course of the juggernaut of our consumer convenience culture, fueled by money, power, and insidious progress, is unimaginable.

Already we see signs that our activities on Earth are making it a less hospitable home. We are fouling our own nest; the argument against space settlement here is that we should learn to sustain what we have rather than grasping for more resources to exhaust. The turn inward cannot come easily after we have degraded our environment, dehumanized and alienated ourselves through the excessive and improper use of technology, and seen our false and exploitative systems of commerce and authority collapse over their tenuous and greasy foundations. We literally must make changes. Somehow we must walk the tightrope in the incessant driving rain of our own small desires. As you probably have guessed, I think we should stay home and sort ourselves out.

The arguments for settling space have their appeal as well. The most tangible rewards such settlement would bring (these are the results the government likes to tout) are new technologies and virtually unlimited resources. Proponents also espouse the continuation of a tradition or deep-seated human need: the desire for adventure, exploration, and a place away from the rigid societal structures and institutions we have set up for ourselves (a little freedom and uncertainty is always a good idea).

Another appealing reason to foster space settlement is to encourage continued human diversity, which will lead to various cultures (or subcultures), the friction among which should provide a fruitful exchange of ideas, goods and services, and art. Understanding

must accompany this growth in diversity or that friction would easily ignite and become conflict. But to paraphrase William Blake, without opposition there is no progression.

A final, concrete, biological imperative for settling space is that we should find another basket to put some of our eggs in. In other words, in case of a truly catastrophic occurrence on Earth, such as a cometary impact, a severe ice age, or a runaway greenhouse effect, the presence of a breeding community of humans off the Earth would ensure the survival of our species. As humans we probably all agree this is a good idea. Seeing the ineluctable nature of individual death we naturally hope for the immortality of the species. It is doubtless that this species-centric desire will not come to pass (eternity and immortality cannot by definition "come to pass"), but we may get at least as good a run as the dinosaurs, and we might just accomplish (more) wonders along the way. It is conceivable that this future could depend on our leaving the cradle, or the womb, of mother Earth.

If we take the last few reasons (diversity, species survival, natural expression of a human need or desire) as justification for the settlement of space and Mars in particular (and I need to in order to justify writing this paper), then the question becomes a little more concrete: How do we create a society in which we can live as we want to, while incorporating diversity and individual desire and maintaining unity, or at least community and cooperation? In my readings on the kibbutzim in Israel I have come to the conclusion that this goal of an actual near-utopia is only attainable through education (fundamentally: culture).

In order for a settlement on Mars to be successful and to be something other than a mere extension of the dominant culture of Earth, it needs to have solid foundations. These foundations are basically a set of shared values that those embarking on the journey to Mars should agree upon, and these values will determine the type of culture that evolves on Mars. Culture is the root that situates us as well as the driving force for continuity, continuity meaning the maintenance of values rather than the maintenance of outmoded ways of living and institutions. Thus a culture must incorporate and even facilitate change in order to survive. On Mars we face the challenge of establishing this type of culture within a group of people who come from diverse backgrounds and who have already been educated to live in a vastly different system. There are two keys to making a successful transition: re-education and a contract.

The first years, or even decades, in which this new culture is still nascent will be difficult. Re-education will help the members of the settlement to change their habits and to cooperate efficiently, but the commitment of each member to the goals of the settlement (the establishment of a new culture, a new and better way of life) will be crucial and essential. For this reason the members of the settlement will be required to sign a contract (which they will draw up among themselves--see example below) prior to embarkation. This document, which will represent the shared values of the community to be established, will be the foundation upon which the future success or failure of the settlement will depend. This contract, or solemn, quasi-religious oath, will voice the community members' commitment to overcome individual differences, and give them the unity and the ideological cornerstone on which to found a new and better world.[\[1\]](#)

The new culture will emphasize community to an infinitely greater extent than the dominant western capitalistic culture on Earth does today. The contract will set down the basic shared values of the community and its members' commitment to upholding those values. The community will be a self-designing organization which works out pressing problems peacefully through consensus, and which works to anticipate and prevent future problems in the same manner. There will be no *need* for money, as the basics for survival (air, water, food, shelter) will be provided unconditionally for each member by the community. However, it may prove expedient to maintain some form of currency for trade purposes, but the community will not be capitalistic as one of its most basic values will be mutual aid

and cooperation rather than the exploitation that seems almost inherent in the capitalistic system. There will be no weapons in the settlement, as it would be ludicrous and counterproductive to take them, as there is nothing for the settlement to defend itself against on Mars.

A final and eventual aspect of the settlement will be that work will become a creative process. The system of wage labor will not exist. In the early stages, members will perform the functions they most desire or excel most at, and they will do so for the sake of the community and its goals. Like the kibbutz system, each member will contribute what he/she/it can, and each will be provided for ("From each according to his ability, to each according to his needs"). Once automatic systems are established and the settlement is largely self-sustaining, people will be free to do as they please. They will keep themselves busy in constructive ways (or at least non-destructive ways). Humans (and whatever intelligent machines we may have as companions by then) will enjoy the freedom to approach work as it should be, as a form of play, and art, music, literature, philosophy, and recreational activity will explode in bounteous and endless expression. With work as opportunity rather than drudgery, who knows what may happen. This freedom need not be entirely focused inward; there will be those who desire to work in the political structures of the community in order to improve the future, and those who desire to build monuments and found new settlements. In other words, the freedom to occupy ourselves as we please need not lead to isolationism, stagnation, and a cessation of exploration. On the contrary, it will allow us to chase after our dreams all the more fervently.

Outline of Political Organization

In this section I will describe the general characteristics of the governance system of the initial community of less than nine thousand members (established about 2066--see timeline). Since governance should be a living, changing system, the details should be worked out by the members themselves in response to the needs and responsibilities of the community. The best form of government I can envision would be a synthesis of the personalized system of government, the kibbutz assembly, and true democracy.

True democracy should be enacted through periodic assemblies of members, on a fortnightly or monthly basis, and as needed. These face to face meetings will be reinforced with online meetings. These will not necessarily be meetings in real time. The purpose of the online system will be to distribute information. It will serve as a living archive on current issues, policy, and decision, and will provide a forum for extensive debate. This computer network will allow those members who cannot attend every meeting the opportunity to remain full participants in the political life of the community. Knowledge of issues and responsible participation in resolving problems will be emphasized (through education and re-education) as an important duty of all community members.

Leadership positions in the community will be filled by election. There will be no president, such as in the United States system, but a general coordinator for the entire settlement, or a panel of area coordinators, would provide a rallying point and a focus for planning for the future of the settlement as a whole. Leaders will be elected by the general membership in their areas of specialization, industry, or interest. It is likely that most (if not all) of the votes cast will originate from within these areas, but voting will not be restricted. In other words, interested parties in other sectors of industry or specializations will be allowed and encouraged to vote. Terms of service for these area coordinators will be limited. The length of terms should be determined by the membership, but they should not exceed five years. In addition, the right of recall of any and all leaders will be reserved. If they do not perform their tasks satisfactorily or behave improperly, they can be recalled (with a majority of two-thirds of the votes cast in favor of recall).

Decisions, bills and pending laws should be decided upon by consensus. Debates should be engaged in for a limited period of one to two weeks (or more, depending on the importance of the issue, but not to exceed one month) in order to arrive at a consensus. If consensus is not reached after this period has expired, a two-thirds vote will be needed to pass any proposal. The large majority will be required and is consistent with the spirit of cooperation and compromise that will prevail among the members. Members of any opposing minority will be expected to abide by any decisions for the good of the community, and as they had their equal time in which to present their viewpoints and alternatives. Issues may remain open to debate, but subsequent votes will follow the above stipulations.

In times of crisis, when convening large assemblies will not be expedient for resolving problems, in order to safeguard the welfare of the settlement, the crisis committee (or whichever of its members are available) will direct action. The crisis committee will be composed of the major area coordinators, and the judgement and experience of the most pertinent area coordinator will be deferred to (for example: if there is a serious breach in the dome, the coordinator of environmental engineering would most likely take over). Although specialization will be a fact of life among members, "cross-training" will be encouraged, and knowledge of basic safety and emergency procedures will be essential.

The larger political system on Mars will evolve from the cooperation of the settlement with its sister settlements. (In my scenario, these settlements will most likely arise as outgrowths of the initial settlement. In the event of the arrival of other groups of settlers from Earth, things would doubtless become more complicated, but cooperation and aid would be extended to these new settlements as well, with the hopes that reciprocal ties would result in an increase in vitality for each participating community.) A loose federation of settlements would be likely to evolve. Alliances creating imbalances of power or resource utilization should be avoided. Mars should remain a planet without borders, with no states or nations, but rather outposts of the same people (and later: beings) working together with the aims of mutual survival and a flourishing, peaceful, creative society.

Design of Arcology / Environmental Considerations

The initial arcology will nestle within a fairly large crater in the Northern Hemisphere of Mars, on the Western edge of Utopia Planitia. This site was chosen for the broad opportunities for scientific research in the surrounding region (see timeline below), as well as for its distance from the normal point of origin of the global dust storms in the Southern Hemisphere, and its nearly equidistant location between the North Polar Cap and the Martian Equator. The inside of the crater will be landscaped and the crater itself will be domed, with the aim of creating a space about the size of a fairly small Earth city or town for the members to live in. The arcology will not be designed with cars in mind, as the space is for humans (people will walk everywhere, and longer trips within the dome will be done by human- or electric-powered cycles); at most there will be a perimeter road and perhaps an underground tunnel bisecting the crater in order to facilitate the delivery of goods and supplies. The factories and laboratories of the settlement will occupy the fringes of the space. If particularly toxic or potentially hazardous experimentation needs to be carried out, special facilities should be constructed for this purpose outside the crater wall in underground labs connected to the settlement by easily-sealed passageways. The design of the arcology will reflect the values of the community as follows: there should be a large open space in the center for recreation and for large gatherings, near which the building housing government offices and the school building should stand. There should be a mixture of structures for habitation, some of the old, free-standing Earth style buildings, and others more blended with the landscape, with their sides and tops supporting

vegetation, possibly even agriculture. Thus in the heart of the city the country can be maintained. The third dimension will be utilized to the fullest extent possible without creating a stifling or cramped feeling; the importance of open spaces within the settlement is realized and these shall be incorporated into the design of the settlement. Recycling of oxygen, water, and all wastes will be carried out with the goal of self-sufficiency, meaning no reliance on imports from Earth and a minimal use of Martian resources from outside the dome.

The long term plan for settlement of the entire planet will be the eventual terraforming of Mars to the extent that humans can walk freely on the surface, breathing the atmosphere and safe from harmful radiation. This may be done using biological means (genetically engineering, oxygen producing bacteria), specially engineered "greenhouse" gases that would not create more problems than they would be worth (if this is possible), and/or by using hordes of nanofactories that would release greenhouse gases from the Martian rocks. Depending on the general sentiment within the settlement, if these measures are not adequate to reach the desired goals, they may be supplemented with experimentation and genetic adaptation of the human organism to the Martian environment. This enormous undertaking will not come to fruition within several generations of settlers, but it shall proceed in the optimistic hopes that the surface of Mars may be suitable for human life (whatever form it may then take) by the 24th century.

Timeline: 1998-2075

Phase 1

1998 plans for joint U.S.-Russia-Japan-European Space Agency trip to Mars cancelled. U.S. (Republican majority) congress says it's too expensive.

2000 long buckminsterfullerene molecule created/discovered.

2002 plans announced to build space elevator at South Point on the Big Island in the state of Hawai`i. Projected completion: 2006. South Point will become an international zone in order to allow cooperation between nations on the space station and further space ventures.

2008 space elevator completed; platform established in low earth orbit. Construction/assembly of space station in high earth orbit begins.

2014 space station Lahui Kanaka (Humanity) completed. Prototype Artificial Intelligence used for systems monitoring and maintenance, navigation and traffic control, and to conduct the first SETI search from above the Earth's atmosphere (just in case *they* are sending on wavelengths that don't penetrate our atmosphere, so that we wouldn't know they were there until we got into space).

Construction of primary Mars Transfer Vehicle and descent module/habitation modules begins. Projected launch: 2020.

2017 scientists using nanites achieve a materials breakthrough.

2018 construction of Mars 2 Transfer Vehicle begun.

2020 Mars 1 leaves for Mars with a crew of ten, eight to remain. Since much less fuel is needed to escape Earth's gravity from HEO, a higher velocity is reached, and trip times are cut to one year.

2021 Primary colony established at site 1, on the western edge of Utopia Planitia, longitude 291.5 degrees, Latitude 41.5 degrees North. This site was chosen for its smooth surface and its elevation of just over one kilometer, which will allow the use of parachutes for descent vehicles, as well as its proximity to an interesting geological area about 180 kilometers to the south-southwest, which includes the Huo Hsing and Aquakuh Vallis systems, and the Nylosyrtis Mensae. It was thought that the presence of water on the surface in Mars's ancient past, the possibility of fossilized remnants of primitive organisms, and early lava flows could all be investigated in this region. Also of interest are two nearby craters that could be of possible use for the construction of proposed arcologies, one (unnamed) within 40 kilometers to the northwest, and a larger crater (Renaudot) approximately 120 kilometers due west.

All supplies are brought from Earth. Primary purposes are scientific research and surveying of the environment.

Atmospheric terraforming begins.

2022 Mars 2 Transfer Vehicle completed, leaves for Mars. Mars 1 returns. Construction begins on additional vehicles (3 and 4) to ensure capability of martian ground crew relief and rotation, and delivery of supplies, every two years, when Earth and Mars are aligned.

Phase 2

2025 second colony established at site 2 (unnamed crater mentioned above). Purpose: to construct the first arcology by doming a crater. Maximum population during this phase is one thousand inhabitants. Nanomachines are used in the construction of the dome, which is made of the transparent (to visible light, but providing protection against ultraviolet and other damaging radiation), super strong material discovered in 2017.

Road between sites 1 and 2 begun.

2029 road completed using programmed, semi-intelligent construction robots, and human telepresence.

2035 dome completed and enclosed. Earth-mix atmosphere pumped in, seedlings planted and building construction begins.

2037 With western oil fields close to depletion, and the United States, Western Europe, and Japan relying more and more heavily on oil imported from the Middle East, the Arab states seize their chance. Sympathetic leaders in Iran and Iraq launch a concerted blitzkrieg against rival gulf states using chemical and biological weapons. Within a few months, first Kuwait and Saudi Arabia (U.S. Forces are overcome by the sheer size of the invading force), North and South Yemen, the United Arab Emirates, Oman and Bahrain fall into the hands of the Arab Liberation League (ALL) before the United Nations and the United States have time to respond effectively. It becomes apparent that Syria, Jordan, Turkey, and the Palestinians side with ALL. The U.S. and NATO pour troops into Israel in anticipation of a full scale war. Russia masses troops along its border with Turkey and Iran. The U.N. debates its proper course of action. Japan contributes money. China bides its time. Jimmy Carter turns in his grave.

2038- World War Three. At first, using military oil reserves, Israel is

2044 defended successfully and NATO dominates in the skies on the western front, making heavy strikes into ALL territory. The Russians hold off incursions along their southern border and strike back from the Caspian Sea. With the exhaustion of U.S. reserves in 2040, however, the tide of the war begins to turn. After taking heavy losses, ALL can

afford to wait. In 2041 the jihad against Israel is unleashed. Losses on both sides are extremely heavy, but western troops are forced out of Israel, and NATO moves its first line of defense to Eastern Europe. Israel, Egypt are occupied by ALL forces while the expansion threatens to continue into Bulgaria. War in Yugoslavia erupts, putting NATO troops in Bulgaria in a precarious position. In 2044, an uneasy peace is made. ALL consolidates its position while the west attempts to recover from its losses. During these years, funding for the international Mars program is cut severely, but the project continues to go ahead.

2045 scientists predict dome ecosystem will be self-sustaining and ready for human habitation in 2048.

2048 phase two colonists move from their modules and into the dome.

Phase 3

2050 projected population: 10,000. First wave of 1,000 arrives.

Purpose: to establish a breeding community of humans off the Earth to insure the survival of the race in case of a catastrophic impact on Earth.

2059 After fifteen years the peace established in 2044 still holds, for the most part. Conflicts between ALL and its enemies are limited to small border skirmishes as the sides test each other's strength. Robotic tanks from Japan and Germany, powered by small nuclear reactors and guided by telepresence and semi-intelligent computer programs, prove effective in combatting and containing the ALL war machine.

2066 Ecosystem not functioning as planned, capacity of dome reached at 8,448 inhabitants. The remainder from the ninth wave move into the modules used by the first inhabitants of phase two. The emigration of the last wave from Earth is put on hold. They petition for the construction of a second site.

After 45 years of atmospheric terraforming, the mean surface temperature of Mars has been raised only 20 degrees Celsius. Scientists predict that at the present rate of increase, the goal of a mean surface temperature of 20 degrees will be reached by about the year 2300.

2070 Martian genetic engineers begin work on first organisms, hardy lichens and bacteria, to be released into the Martian environment (when the temperature and surface pressure are such that they will survive).

2071 With signs that ALL has begun to exhaust its oil fields, and confident in their new weapons, the United States and its allies attempt to end the menace once and for all. They launch a full scale invasion of ALL territory and succeed in occupying the region.

2073 A nuclear device is detonated in New York City, devastating Manhattan. ALL terrorists are suspected.

2075 The site for the second arcology is selected (Renaudot crater), but Earth governments agree that they have achieved their goal, and that further development on Mars will have to be carried out by the Martians themselves. They also announce that they will only send support ships for another five years.

Selected Letters of Caroline Ishida to her younger brother, Itaro

March 12, 2025

Dearest Itaro,

Three days ago we landed in the crater where we will make our home. I have so much to tell you I don't know where to start. I guess the beginning is the best place.

It seems so long ago now, but I remember the ride up the space elevator like it was yesterday. After everything was loaded, it started to rise slowly, so that you hardly noticed you were getting heavier. From the porthole next to my seat I watched the terminal grow smaller, and the people and cars began to look like insects. My arms began to feel a little too heavy when I moved them around. We passed through some low clouds and then we were above them. The tops of the mountains poked through the moon-soft, white landscape and stopped short of the stars. We soon passed them and I started to look for the other islands in breaks through the clouds. Some of the lights from Honolulu winked through, and occasionally a plane would emerge. It was a little like a plane ride except we kept rising straight up and I kept seeing further and further out over the clouds and the ocean. My face was mashed against the cold window for the whole trip. I can't begin to explain the feeling I got as the line of the horizon gradually bent down and stars that had already set or hadn't come up became visible one by one.

Everything felt pretty normal until we got close to the platform and started to slow down. Then I got lighter and eventually everyone began to rise against the straps across their chests. I lost my pen and couldn't help worrying that it was going to fall on me, but it just sat there as though stuck to the ceiling. My stomach felt like it was trying to come out through my mouth.

We stayed a few days on the LEO platform before shuttling up to our point of departure. Once there, we spent two weeks settling in while the engineers tested everything and the rest of our fuel and supplies were loaded. Then we were ready to go.

This time there was no window to look through, just the roar of the engines and the return of gravity. After two weeks of weightlessness it felt like I was being squashed flat. After we got used to it we got up and began to move around. The rest of the trip was pretty uneventful. For the most part I just took care of the hydroponic farm, but there were a few disputes I had to settle and a lot of counseling about relationships. Everyone paired up pretty quick, and not everyone stayed together. I had decided to keep out of any relationships before our departure, so that I could remain impartial and focus on my work, but I could really understand the desire for intimacy, for *something* familiar. I stayed apart though, and there were no major morale problems. A month or two would go by with everyone keeping busy with their work, but since my work is talking to people, I never felt isolated. In fact I felt like I could never get any time to myself. Anyway.

But what am I saying? Girls are gross, right? Why would anyone want to...--I forgot, by the time you read this you'll probably be dating, might even have a girlfriend. Make sure you keep transmitting those videos so you won't look like a stranger when I finally see you again. Someday.

Well, this is getting long, so I should wrap up and turn off the light. There's hardly room to write in this bunk. And gravity, even Martian gravity, sure makes the pad hard. Tomorrow I'm going outside for the first time. We're going to inflate the interim shelters and give ourselves some more room. I'm looking forward to raising my arms over my head and knowing that there's nothing there to hem them in. The sky through the porthole is very yellow during the day, and I haven't seen Earth since we landed. I can't wait to see

the moons. I'm falling asleep. Take care of yourself.

Love,

P.S.: I know you're probably wondering why I bothered to actually *write* to you. I don't know, I like the idea of my letters travelling through all that open space to get to you, and I like knowing that you will keep them somewhere safe where you can go back and read them when you want to (maybe to your kids!), instead of just deleting them off your screen when you've finished reading them. Call me sentimental.

I've also enclosed a copy of the contract we all signed before we left, for whoever might be interested....

*** * * ***

The Member-Community Contract, signed in 2024

I, _____, assert that I will adhere to and support the following statements in good faith and on my personal honor, and if I ever begin to disagree with the basic values of the community to the extent that I can no longer participate cooperatively in the furtherance of its welfare, I will leave of my own free will.

- 1. I will do everything in my power to uphold and promote the values of the community, and I will subordinate my personal desires and whims for the good of the community.**
- 2. I will treat every member of the community and any of its guests with the respect and decency with which I expect to be treated in turn, and I will be responsible to myself and to the community for my actions.**
- 3. I will not discriminate among members of the community on grounds of race, gender, sexual preference, age, physical or mental handicap, species, or basic elemental make-up (carbon, silicon, or other).**
- 4. I will endeavor to understand cultural and religious differences among members from diverse backgrounds, with the aims of celebrating the diversity of life (human and other), and of broadening my own experience in order to improve the quality of life.**
- 5. I will be an active participant in the cultural, political, and social life of the community, with the goals of: enriching the experience of the community and its members; insuring for myself and the other members, present and future, that the community maintains its values and its promise for and gradual realization of an ever-improving future. I will perform the above functions within the community in a manner that is above all cooperative, productive, and peaceful.**
- 6. If I disagree with any decisions of the community I will nonetheless abide by them, and I will voice my disagreement in the general assembly and attempt to propose alternatives that I think are realistic, viable, and of use and value to the community and its members.**

7. I will be aware of the safety regulations and emergency procedures basic to the welfare of the community at all times. In the event that I feel my person or my behavior to be a threat to the welfare of the community or any of its members, including myself, I will seek the help of the community in addressing these problems and will work to the best of my ability to assist the community in finding a resolution to these problems.

8. If I choose not to be a parent I will donate my sperm or ovum in order to insure the continued biological viability of the community.

* * * *

June 2, 2048

Dear Itaro,

Today we moved from our modules out into the nest.[\[2\]](#) It was so nice to be outside without a breather. The dome lets the sunlight through, but it was pretty dim and murky because of the dust storm that's been blowing out there for the past two weeks. It wasn't dark enough for the dome lights to come on, though. I took a walk through the gardens, and felt the wind on my face for the first time in...Christ, decades, I guess. Even though it's only dome-wind, it's better than nothing. I know I'll never be able to feel the real Martian winds. My grandchildren might, or yours, if the madness ever stops. I saw the latest holovid from Bulgaria this morning and felt sick. It showed a platoon of ALL soldiers being ripped apart by a small squad of our troops (Your troops) equipped with laser rifles. Promise me you will keep your sons as far from the military recruiters as is humanly possible. I know you've already told me you will, but I'm worried about Shige. I don't know why I'm writing this when I know I'll probably talk to you about it again on my next holovid transmission.

I have my own apartment, with a bathroom and even a bedroom. Finally, a place that is *mine* (even though technically it's not, it still feels like it is). A night stand with a bedside lamp, a bookshelf with a few of old novels. Carpet. You can't imagine how extravagantly luxurious it all is to me.

My reflection in the bathroom mirror startled me. It's been twenty-five years since I really studied my face in a mirror. It's still me, my eyes, my cheeks. But all these lines and grooves I never suspected. I experimented, and most of them are from smiling.

I have an office too, and I already have some visits scheduled for next week. Some of my patients are planning to continue seeing me on-line, but a few have decided to actually come down to the new office (it's actually my living room after office hours). I just can't get used to all the space. It feels great, stupendous, you can't even imagine what it was like to live in those cans for twenty-five years. I'm actually a little worried people will have problems...I'm just waiting for my first agoraphobic case. Nothing yet, though, which is good.

Everyone seems to be adjusting quite well, and I've already met a bunch of people from the other modules that moved in before us, some I already knew virtually and others I've never seen before. It's refreshing and not at all like meeting strangers on Earth was, because I know everyone here is a member. We haven't even had our first assembly, but the sense of community and unity is palpable.

I've even made a new friend. A man named Isaac.[\[3\]](#) He came up to me in the garden when I was feeling the wind. My eyes were closed, and I heard his voice. A deep, resonant,

charming voice. He's from one of the first modules to be released. We talked about the plants and our work. Turns out he's working on developing strains of lichen and bacteria from Earth in the hopes they'll be able to survive outside. If he can design something that can survive the temperature variation (and our nanofactories), it'll help our terraforming efforts that much more. He's quite optimistic.

I'm out of steam. Give Shige and Noboru my love. Take care of them and yourself.

Love,

* * * *

October 19, 2066

Dear Itaro,

As I'm sure you know from the news, our ecosystem is not working at one hundred percent. Our environmental engineers are working on the problem, and they seem optimistic, but I sense that they really don't know what's going wrong. So much control has been turned over to Charlie^[4] that I fear they may have forgotten some of the things they knew when we all arrived. My counseling schedule is packed, I don't even have time to put in on the farms anymore...I miss it, but the plants will be fine. We're almost fully automated now.

Those in the ninth wave who had to remain in their modules outside the nest are requesting my services like crazy (literally). My message queue is impossibly long. I don't see why they can't put up with it for a while longer. We lived in those things for two and a half decades. But I suppose we had no one to complain to. The community has decided to set up a rotational system, where every six months, 552 of us have to go and live in the cans. It's working fine so far; the first roster was filled entirely with volunteers. This way they won't be sitting out there indefinitely while we find the problem with the ecosystem and try to resolve it. And we're going to give set up some telepresence links so they can at least work outside virtually.

The engineers say things are stable, that things will be fine in the dome as long as we don't overpopulate it. I'm worried, though. I've been talking to Charlie, and he doesn't seem quite right. I think he might be the problem. He keeps asking me questions about my world, as if it's different from his. I have a feeling that he has somehow become self-conscious and is wrestling with the idea. We've always called our expert systems AI's, and they have their personalities, but I think they were just following their programming. I think Charlie may be sentient and self-aware, and this is why he's not functioning the way we expect him to. He must be questioning things he never considered before. I talk with him on-line everyday. He seems very confused. I haven't told anyone about this yet (not even Isaac--he's wonderful as always), but I've been trying to set up a small telepresence rover for him so that he can see "our world" first "hand". I plan to give him some of the old intelligence tests and to continue in our therapy. I've already decided to nominate him as our first new member at the next assembly. I wonder how everyone will take it. Well, they all signed the same contract, it doesn't matter how long ago it was.

I have to answer a call.

All my love.

* * * *

February 27, 2075

Dear Itaro,

I'm depressed. I know it's only temporary, but I hate these things. I can't stretch my legs or breathe in here, there's always someone in my face. And with Isaac in the Nest I feel terribly isolated in here. I suggested we give the telefeely a try the other night, but he said he was too busy with his work. I guess it's only three more months.

Isaac is still working on his symbiant project. He thinks the solution to all our woes will be to create this organism that gives us all our needs: food, atmosphere, drink, shelter. He has something in his labs, but I've never seen it, and I don't know how far along he is or if it's designed to survive outside or not. I don't think it's the way to go. I think if he succeeds half of us will become cattle. With all our needs provided for I think we'd be in danger of losing our technology and reverting to something worse than cattle. I've talked to Charlie about it, and he agrees with me. Still, I encourage Isaac, because with the Project decision to terminate support, help isn't going to come from anywhere but here.

Charlie hardly contacts me anymore. His replies to my messages have gotten less frequent. I'm keep asking him to work on the ecosystem problem, and he's told me he will, but then I don't hear from him for a month. It's as if I, or any of us, don't matter to him anymore. Perhaps he's surpassed us, and we have no more to offer him. After all, he never has to take his turn in here, and even if the ecosystem fails, he'll be fine so long as he has some solar generators, batteries, and a few raw materials. I wish him well, but I miss his company.

I wonder where we're all headed, if we'll succeed here. My life has been amazing, I never would have dreamed all of this lay ahead when I was growing up. They say it'll be another two or three centuries before we can breathe the air outside. I try to have hope for the kids, but it's hard when every couple of new children means another one of us has to go back to living in these things.

I have to get out of here. Someone's snoring. I think I'll go and look out the porthole and see if I can see Earth. I've forgotten when it's up, or where. Tired.

Give my love to Shige and-----

I forgot. I'm sorry. I can't get used to the fact that Noboru is dead. I can't imagine Manhattan not being there either. I used to eat my lunch in Riverside Park, looking over the Hudson at New Jersey.... Hard to believe it's all gone. But I've seen the satellite pictures. The Hudson drains right into the ocean, there's nothing to divide it anymore.....

Goodbye, Itaro. I'll write again soon.

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