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A Colony on Mars

FORWARD

Based on what information we now have it appears that it might be possible to place a self sustaining colony of human beings on Mars. All of the necessities seem to be available. We now know that there is plenty of H₂O water available beneath the thick layer of frozen CO₂ Carbon Dioxide at the South Pole. It is assumed that the situation would be the same at the north

pole. There is also good evidence that there is liquid H₂O water flowing beneath the surface of the planet. The known water at the South Pole alone would be adequate to cover the entire planet with pure water to a depth of approximately thirty six ft. So, at worst ample water would be a solvable problem.

Habitat is a problem because the Martian atmosphere is ninety five percent Carbon Dioxide, and only 3% nitrogen whereas the atmosphere of Earth is 78% or so nitrogen, 21% oxygen and less than 1% Carbon Dioxide. There is a solution to this problem. Recent photos have shown that below the surface of Mars there are many large fissures, caverns if you will. One is known to be at least three times as wide as the Grand Canyon, three times as deep and nine times as long. This would not be a little cramped space it would be about the size of the State of Rhode Island. A breathable Earth like atmosphere can be made with water and nitrates. There would be plenty of water. Initially smaller more manageable caverns could be used while work was being performed on larger caverns. Caverns could eventually be interconnected. One estimate I recently read was that there were caverns beneath the surface of Mars equal to the size of the Continental United States. This would be a large habitat indeed.

Gardens could be grown underground using electric grow lights. There are already new strains of plants being developed on Earth that are far more efficient at photosynthesis, the process of converting Carbon Dioxide to oxygen. If sufficient Nitrates are available to the plant from the soil then the plant will consume Carbon Dioxide and produce a breathable atmosphere for man.

At present the mean temperature on the surface of the planet is fifty five degrees below zero, Fahrenheit. The warmest temperature ever recorded on Mars was eighty degrees above zero, Fahrenheit. Mars receives far less sunshine than the Earth because it is further away from the sun. Twice a year during the equinox the wind speeds on the planet surface reach two hundred fifty to four hundred miles per hour. A man left unprotected on the surface would be dead in under a minute.

Mars is only seventeen percent the size of the Earth. Mars, in many ways is more comparable to Earth's moon than it is to Earth, except that the minimum gravity that man can survive comfortably in is 33% and Mars gravity is thirty five percent. Living in a pressurized cavern in an atmosphere rich in oxygen, taking the proper vitamins, getting plenty of exercise and spending some time in artificial gravity of one g, Earth's gravity could go a long way in making Mars more habitable. Mars has no ozone layer that protects the surface from exposure to extreme radiation. The radiation on the surface of Mars is deadly.

It has been said that all that is needed for survival is a reliable energy source. On Mars there are probably no fossil fuels however the frequent volcanoes indicate that geothermal energy would be plentiful. So much for heat and electricity.

The Martian soil is known to be extremely rich in iron. So far there is no information that I could find as to the presence of other minerals but with the high presence of iron there are bound to be others we just have not found them yet or reported them yet.

So there you have it everything that man would need to survive is awaiting him on Mars. The technology is already available all that we lack now is the resolve and the commitment.

NOTE: No time and date system has been universally accepted for keeping the time and date on Mars, at least not as of 2108. When and if Mars is ever colonized a standard will be established. Please go to <http://pweb.jps.net/~tgangale/Mars/faq.htm#day> where you can read everything you ever wanted to know about keeping track of time and dates on Mars. Some interesting facts are as follows: A Martian Day is 24 hours 39 minutes 35.24409 seconds long, a Martian year is 686.9726 Earth days in length. A Martian Day is called a Sol.

How does the eccentricity of Mars' orbit affect the seasonal variations?

Earth's orbit is very nearly circular, and so the four seasons last approximately the same number of days. The orbit of Mars, however, is a bit more eccentric (0.0934). In accordance with Kepler's laws of orbital motion, Mars travels more slowly in its orbit when it is further from the sun, and more quickly when it is nearer to the sun. Mars reaches its furthest point from the sun (called "aphelion") when it is spring in the northern hemisphere. This has the effect of making spring the longest season (193.30 sols), and summer the second longest (178.64 sols). Mars reaches its closest point to the sun (called "perihelion") when it is autumn in the northern hemisphere, and consequently autumn is the shortest season (142.70 sols), and winter is the second shortest (153.94 sols). On a calendar containing 24-months of equal duration, spring lasts seven months, while autumn lasts a little more than five. Summer has a little more than six months, and winter has a little less. This paragraph was plagiarized from the above mentioned website. I suppose that if this story is ever released as a book I will have to get permission to use it or completely reword it. Perhaps now you will understand that for the purposes of this fiction story the Author has taken license to have the characters in the story use Greenwich mean time and the Earth calendar and to say that the scientific community at the colony maintains and prominently posts the Martian time and date which is available to anyone planning to work on the surface.

Until the reader reaches PART II of this book he will have no idea of what the story is going to be about. I would encourage you however to not skip ahead to part II. If you do not read part I then part II will be meaningless. Part II begins about two thirds of the way through the book.

This story then will be the author's fictional concept of what might take place if mankind were to embark on a project to colonize Mars.

PART I

CHAPTER – Tim and Carla find work

May 28, 2107 : “Hey Honey, look at this ad in the Review Classified, I don't believe it, we gotta check this out tomorrow morning.” “Don't believe what you read Tim, you know, if it sounds too good to be true...” “I know Carla, If it sounds too good to be true it's not true.” “But I think this may be different. The ad was placed by Mars Colony, Inc. They have been working up there for several years now and they are hiring, and look at what they are paying!” “Lets see that ad, WOW”

“WORK ON Mars, That's right, we are now hiring in all categories, unskilled, skilled and professional. The lowest wage we pay is \$15,000.00 monthly to start. Ten year contract, required. All board and room equipment and uniforms furnished. Must be an English speaking U.S. Citizen, between 25 and 35 years of age, have a clean police record, pass a rigid physical examination, pass a drug test and have at a minimum a high school diploma. Bring your birth certificate, shot record, national ID and health card, copies of any diplomas or degrees and a detailed resume to Room 2277 Hempstead building between 8:00 AM and 1:00 PM any weekday.”

“We are here about the jobs on Mars, is this for real?” It sure is, just sign in and have a seat in the waiting room through that door, one of our counselors will be with you shortly.” There were about twenty others already seated in the large waiting room. It looked as though there might be quite a wait. A large table at the entrance was covered with stacks of printed brochures. They each selected two or three pamphlets, and found two seats together.

The man introduced himself as Hal Bergstrom, he addressed the entire group. “So either you people want to become Martians or the money brought you in, either way, you are here. I thought I could thin this crowd out a little before you go to your interview. As you probably already know Mars has the potential to support a population of over three hundred million people, but that is only the potential. Right now there are fewer than three hundred workers on Mars, their living conditions aren't the best. All but twenty seven of them are U.S. Government employees, mostly scientists and such. They presently reside in a cavern that covers about one half square mile.

Back in 2095, almost twelve years ago the Government sent in a work crew of five hundred men from the Army Corps of Engineers. These workers took two years to construct the present habitat. When they finished their

project, they left to returned to Earth.

“Once the Corps guys departed the Government people started to arrive. One of the first projects that they embarked on was mounting the telescope in a dome that had been constructed by the Army when they were there. This is not as large and powerful as some telescopes on Earth, or in Earth orbit, but Mars gets to view area's of the star systems that can not be seen from Earth. On Mars they have several large dishes mounted on the surface that allow searches by radio telescope.

There is plenty of water available in the caverns. “Everything else that they presently have use has been brought from Earth. Electricity is provided by a generator located in a walled off corner of the cavern. Atmosphere is manufactured by an apparatus brought from Earth.” Their toilet facilities are in yet another nearby cavern. They consist of porta potties separated for men and women. There is a tank of hot and cold water with a dozen showers and wash basins in each bathroom. The atmosphere has a stench to it, not just in the rest rooms but everywhere. When you first arrive you will be appalled by it but after a while you will hardly notice it.

If you are claustrophobic you do not want to take this job. The only way that a human can go to the surface is clad in a Mars suit, which is similar to a space suit. They do have plenty of water, underground rivers are plentiful. There are fish in the stream but you can't eat them they are poisonous. We really don't even want you touching them until we know more about them. There is a small video library and each of you will have a personal media player. That is about all there is to relieve the tedium of daily life.

Our company has had an average of ten employees there for the last five years, it has taken them that long to prepare, seal and pressurize a small cavern for the three hundred employees we are now hiring. This new Company cavern can be reached by a short tunnel from the main cavern. It was just recently pressurized with atmosphere which made it habitable. We are now ready to send in work crews. Mars Colony, Inc. has the contract from the Government for construction of all the additional necessities. Much of your work will be done in the hostile atmosphere on the surface of the planet wearing Mars suits. A Mars suit is very cumbersome to work in. We need to build a sewer plant, install indoor plumbing, with toilets showers, water heaters, a geothermal electric generation plant and run the electric wiring. In a few months we want to start tunneling toward the next cavern. Our eventual goal is a monster cavern located about six miles from the present caverns. You will be working a eight hour day, six days a week.

This round of hiring, for three hundred workers who will be leaving Earth on an interplanetary ship in early July of this year. Once you arrive, the only way you will have to communicate with Earth is by home video or letters that can be shuttled home whenever a ship from Earth docks. There are presently about four ships per Earth year. Mars years are twice as long as ours but don't worry your ten year contract will be for Earth years. Any of you who want an

interview please stay in your seats. If you have any doubts about that lifestyle please do yourself a favor and leave now.”

Eight people got up and left. Tim and Carla exchanged a long silent look into each other's eyes and then remained in their chair's. They were then ushered into what looked like a classroom with desks and terminals. The instructor in the front waited until they were all seated then the screens in front of each of them flickered on, an application appeared. After two hours they had finished the application. Some who had already finished had been ushered out. “There is always something that you don't think to bring, Carla remarked but I suspect that I will have time to provide it for them before we leave for Mars.

Carla was presently employed as a short order cook in a chain restaurant. Tim had finished high school early at seventeen. He had obtained his degree in engineering from Texas A&M at twenty one. When Tim was a student at A&M Carla was working as a cook in the cafeteria, that 's how they met. They were married when Tim graduated. It was a small wedding, attended only by Carla's family and a few friends from the University.

Tim and Carla had moved to Las Vegas two years before when Tim had been Laid off from his job as a drilling engineer in Houston, Tim had taken several construction jobs in the booming Las Vegas building industry just to put bread on the table but so far had not landed another engineering job. He had hoped to get employment in the mining industry as an engineer. There weren't many new wells being drilled in the U.S. anymore and many of the drillers and engineers were finding other employment. You might say that Tim just hadn't found himself.

They had the usual amount of personal debt, car payments and credit card bills but all of their bills and payments were current. They wanted a family and a home of their own, someday. For the time being they both had to work on their menial jobs just to make ends meet. The home and the family were something the future might hold for them.

June 1, 2107 : At their interview hey were given a longer version of the speech that they had earlier heard from Hal Bergstrom. The woman who conducted the interview seemed to be bent on convincing them not to take the job. They were told that if everything on their application checked out and if they passed their physical examination, and their psych tests, they would be hired. It was their lucky day. They were both offered jobs, Carla cooking in The Company mess hall and Tim working on one of the general construction crews. They would need to prepare a last will and testament and a living will. They would each need to open a bank account where The Company could deposit their pay checks. They would each have to have a signature card signed by the person or firm that they wanted to designate to handle their financial affairs for them for the next ten years. One nice thing they learned at the interview was that all money earned while working on Mars was free of all State and Federal Income tax.

The Psych test for each of them was scheduled on the same day. Tim and Carla didn't think it would amount to much. They arrived at 7:30 AM on the third and were sent back to the classroom where they had filled out their applications. At 8:00 AM the screens on the monitors lit up. They were told to read the question on the screen select the answer to the question and then click on next. One at a time they read the questions and selected the best answer. They were not told how many questions to expect but they did not imagine that the test would more than 100 questions. There were 250 questions. Most of the questions were preference questions, very few knowledge questions. After answering question 250 a message appeared on the screen that thanked them for taking the test and were told that they were free to leave. Both Tim and Carla finished just before noon. Carla was done a little ahead of Tim. She just remained in her seat until she saw that Tim had finished. By the time they left it was about noon so they went to lunch at a cafeteria across the street from the building and discussed the test they had just taken while having lunch.

"That was the stupidest test I have ever taken, have you ever taken a test anything like that when you were attending A&M, Tim? "Nope, that was completely new to me. I think that even though most of the questions seemed inane and pointless that Mars Colony, Inc. now has a pretty good idea of how our mental processes work, how we would be expected to react to any situation, how tolerant we are of other people, how patient we are and a lot of other stuff about us that maybe we don't know about ourselves. We are just going to have to wait them out until the results come back, however long that takes."

Before they left the cafeteria Tim's phone rang. He answered and was told by the girl on the other end of the line that he had done very well on the test. "You seem to have the exact psychological profile that we are looking for Tim. By the way, is your wife Carla with you right now? If so please tell here that she also did very well and fits the profile that we are looking for. You both passed, congratulations." "That part of their hiring process was certainly easy enough," said Carla. Little did Carla know that more than eighty percent of the people who took the test had been dropped from consideration for employment. It wasn't that they were bad people or that weren't intelligent, it was just that their test results indicated that they would not function well in the environment that they would be living in on Mars. The Company did not want to go to the expense of sending people to Mars that would be unhappy with their situation once they got there.

"My God, Tim do you realize what we are doing, you will be thirty six and I will be thirty seven before we get back home." "Well Hon, by the time we get back this won't seem like home anymore, and late 30's is a great time to retire and see the world. The way I have it figured we should have over three million dollars in our account by then." "Sure, if we last that long, we can return to Earth any time we want but it will cost us five hundred thousand dollars each to abrogate our contracts with The Company and an additional one hundred thousand dollars each for the trip back to Earth, that is what Tony told us at our

interview, remember. No, if we go we will stick it out for the ten years, no matter how bad it is. After all it couldn't be any worse than going to prison for ten years, could it?"

The trust department of their bank agreed to handle their financial affairs and they put a local attorney firm on retainer to periodically check up on the bank and receive their mail. The firm agreed to forward their important mail at every opportunity when a ship was leaving. For now they would get their mail about four times a year, hopefully that would increase to monthly before their contract was up.

Mars Colony, Inc. had given each of them a one hundred thousand dollars in advance pay which they had deposited in the bank, well most of it anyway. They kept out fifteen thousand for spending money although they had no idea where they would spend for on Mars. On the last week before their departure Tim and Carla had paid a final visit to the Attorney Firm that would be representing them and handling their legal affairs for the next ten years. They had left their car with an officer at the bank two days before they left for him to sell, pay off the loan and deposit the rest in their account.

They had visited their families, their friends, their dentist's and their doctors. Carla had a hard time saying goodbye to her parents and her brother but Tim only had his father to say goodbye to as his brother had been killed in Iraq in 2106 and his mother had died of cancer when he was a child. His father had remarried when Tim was a junior in high school. Tim never cared much for his stepmother, the feeling was mutual. Tim had an easy time of saying his goodbye's.

The night before they their friends had thrown them a big going away party. They were wondering if they could get any sleep at the Earth Orbiter or on the ship after boarding. They were both a little under the weather.

July 7, 2107: It was already over ninety degrees at 7:30 AM on the morning of their departure. After check in they made their way to the tarmac boarding area of the North Las Vegas airport where they were ushered aboard a Shuttle for their flight to the Earth Orbiter. The Shuttle looked a lot like one of those little commuter jobs but this was one that could take off from a runway on Earth, fly through the troposphere, stratosphere, Mesosphere, Thermosphere, Exosphere and on into space. Shuttle are capable of supersonic speeds but when they are used as space shuttles they fly at subsonic speeds until they enter space. At a certain altitude the engines on the Rocket propulsion system kick in and the jet engines shut down. They can return the same way for a soft landing on Earth.

From the Earth Orbiter they would board the interplanetary ship that would carry them to Mars. The ship they were to board was called Mars Supply Two. The other ship that made the Mars run on a regular basis was called Mars Supply One. They were told that each ship made two round trips per year. "Impressive names for one of mankind's greatest achievements, don't

you think, Tim.”

They were able to get a good look at the Mars Supply Two from a port hole on the Shuttle. It loomed much larger than they had expected. Since the ship had been constructed in space and would never leave space weight was not a consideration, nor was size. The ship was assume, It was cigar shaped, at least four hundred yards long and appeared to be about seventy five yards wide at the beam. It was enormous, They later learned that this would be only the second voyage to Mars that this vessel had made. Until last year there had only been The Mars Supply One. This ship was a carbon copy of The Mars Supply One.

They had a some misgivings about the flight that would take almost two and a half months, but they were given to understand that the ship would be very comfortable and spacious. Their time would mostly be taken up by training and orientation classes so that by the time they arrived at the Mars Orbital Station they would know about as much as it was possible to know about what to expect when they actually reached their new home.

CHAPTER - The trip to Mars

July 7, 2107: Upon arrival their Shuttle pulled along side the Orbiter then matched the orbital speed. They heard some clunking sounds then after about five minutes the door slid open. There were about 35 passengers on the flight from Las Vegas, most appeared to be in their mid to late twenties. Just as with a conventional airliner passengers began to stand up and retrieve their carry on luggage. A young lady in a snappy light blue NASA uniform appeared at the door and ushered the passengers into the orbiter terminal. They found seats in the waiting room. They were seated beside a large man. They assumed the man was to be a passenger on the same flight they were taking, and struck up a conversation with him.

“Hi, I am Tim Erkin and this is my wife Carla, are you also a new Mars Colony, Inc. employee?” “Yeah, I was just hired” said the man in a deep baritone voice that you would expect from a man of his size. “My name is Archibald Shrimp, but everybody just calls me Archy. I am from West Virginia, I signed on as a laborer but I am also a part time minister of the gospel. I was called for preachen bout eight years back. I been worken in the coal mines most of my life. I spect we gonna get to know each other pretty well in the next ten years.

They had a chance to become only briefly acquainted with Archy before the NASA hostess announced that they could now board and get their room assignments. The thirty five of them were lead through the air lock and into another waiting room, this time on the ship.

Carla remarked to Tim “That man we just met just does not seem like the kind of person that the company would hire, he talks like he is downright ignorant.” “That’s not the impression I got,” Tim responded. “I’ve been back in those hills touring the coal mines and that is the way they all talk.”

A junior ship's officer dressed in a blue jumpsuit, and wearing ensign's bars, started calling names from a roster. White clad attendants lead the passengers off one by one or in groups of two, to the assigned rooms that they would be calling home for the next two and a half months.

Tim and Carla were told that since they were a married couple they were entitled to a suite. Their Suite turned out to be an eight by fourteen foot room with a double bed, two folding chairs and a small round table. The floors were carpeted. There was a fairly large TV screen mounted on the wall in front of the bed. There was also a built in dresser and mirror. There was a four foot by five foot enclosure near the entrance that took up part of their space, it contained a shower, toilet basin and mirror. All in all pretty spartan but what did they expect on a space ship.

They had no more than put their carry on luggage on the bed when there was a knock at the door. It was the their steward who had shown them to their room. He introduced himself as Damian, their steward. He told them to let him know if they needed anything, not that he would get it for them but he would tell them how to get it. They could always reach him or the steward on duty through the intercom mounted on the wall beside the bed. “At the moment though,” he said, you are to go to The Company Room 812 where you will be issued your on board ID cards. They will be ready for you when you get there.”

Following Damian's directions they took the narrow stairway down three floors to the eighth floor where they located room 812. They received yellow ID cards with their picture on them. They were told they must wear these ID cards at all times. They later found out that yellow meant they were workers employed by Mars Colony, Inc. The nice young lady that issued them their cards ask if they had any questions. “Yeah, where is the dining room the class room and the bar.” asked Tim? “Here is a map of the parts of the ship that you are authorized access to. I am afraid that we refer to the dining room as the mess hall. The bar only serves soft drinks or coffee. It is called the 'Day Room' you will be going to different classrooms from time to time. They are all numbered on your map. You will see color coding on each floor, you are only authorized access to the top three floors, 8, 9, and 10. Enjoy your trip, these are the best accommodations that you will have in the next ten years.”

In their exploration of the top floors they found a nice Day Room with a small library, a mess hall that would seat about four hundred diners an adequately equipped gymnasium. They also located several locked classrooms. Peering through the doors revealed some strange paraphernalia inside. Many of them resembled what was probably a rendition of the Martian landscape.

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