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The Martian Water War: Notes Found in an Airlock

By Peter Gleick

Excerpt from the "Final Mars Water War Joint Investigation Report: Summary"

As part of the investigation and joint report into what has become known as the Martian Water War, the following notes were transcribed from the diary of Jiang Ying Yue, Hydroponics Trainee Level 1, recovered by the joint Search and Rescue Team Bravo from Yinghuo Base and Herschel Station, Mars Day 34, Earth Year 2115.

TO WHOM IT MAY CONCERN, I guess you might as well read my diary now that I'm dead and can't be embarrassed. The DNA reader can unlock it.

Well, I'm not dead yet but will be soon, and inevitably. So it goes, as that weird old Earth author Vonnegut would say. I don't really mind. Though I wish I had let Qing Yuan kiss me at my party last week. I'm nine Mars years old — seventeen Earth years — plenty old enough, for goodness sakes. I even aced my hydroponics tests last week and got my Level 1 Tech certificate.

Death here has always been just a random micrometeorite or crappy valve fitting away, never far from our thoughts and drilled into us every day since birth. Decompression drills. Surface rescue drills. Sandstorm drills. Launch failure drills. Epidemic drills. Blah, blah, blah.

Well, the laugh's on me. Those drills saved my life. For a short while, anyway.

I guess it shouldn't have been a surprise when the water war began, but as Mom's old saying goes, *shì hòu zhū gě liàng* — 事后诸葛亮 — we're all geniuses after the fact. The Earthers thought they were starting anew when they left home, renouncing the old hatreds, the old ways of thinking, the old religions and histories.

But they were lying to themselves, and to those of us born here, the real Martians. They brought all that shit with them. I don't know if it's human nature — the drive to fight, to seek power and advantage over others. You might think that kind of competition would be a natural evolutionary consequence here on Mars, where the struggle for the most basic resources is a fact of life. But we younger Martians know that cooperation, not conflict, is the key to survival here.

And now that old Earther thinking has killed me. And probably my friends and family, too.

The war is over, I expect. My tab won't connect to the base's datastream so I'm not really getting any info in this airlock. It was a short-lived conflict, of course. We didn't have all that much to lose. But maybe the survivors will learn something new — leave Earth's human nature behind. If you want to live here, take some advice from those of us born here.

As the first real Martians, we all heard Earthers' stories from our parents, about how hard it was to leave home and family, to travel through space, to establish the new colonies. They always said they were driven by the chance to conquer new scientific frontiers and their belief that the long-term survival of humanity required stepping out first to the planets and then to the stars. But I know our colonies were also built by desperate people fleeing the growing threat of climate change and environmental destruction on Earth, and by corporations seeking economic profit and insulation from growing constraints imposed by Earth's governments.

So they came to Mars. My parents and the first colonists mined and

refined minerals into whatever materials they needed. They built infrastructure, housing, and labs. They searched for signs of life, and eventually and inevitably created their own — the first babies born on another planet. Me and my friends.

But it turned out that the ultimate challenge to succeeding on Mars wasn't the brutal cold, the dim light, the harsh atmosphere, or the psychological and physiological barriers to living on a different world.

It was the water.

Water is the key here. We learn that early. No water, no food. No water, no fuel. No water, no air.

Mars has water. Humans speculated about, discovered, and studied Martian water for centuries. We're all taught in school about the earliest telescopic observations of Mars in the 1600s by Cassini and Huygens. A century later Herschel identified what looked like ice caps. In the late 1800s and early 1900s, Schiaparelli and Lowell thought they saw channels, canals, and seas through their telescopes. Better instruments gave early Mars watchers the first hints of ancient riverbeds, lakes, and oceans, and then detected water vapor in the thin Martian atmosphere. Satellites and robotic rovers sent here at the end of the twentieth century confirmed the presence of water ice at the Martian poles and identified subsurface soil ice and moisture.

That clinched it for the first colonists, and when they finally came to Mars, they settled where there was water.

Ten days ago, Mars had three independent colonies. I don't know what's left of them. I'm afraid most of my home, Yinghuo Base, is probably in ruins; my section definitely suffered a catastrophic rupture. After the explosion, I isolated and locked down my core, which is still leaking air from holes I can't find to patch. It was kind of cool, how all that training kicked in automatically, but now I'm holed up in an airlock, sucking down the last emergency oxtank, and my comms are dead.

Not so cool.

If I look out the edge of the airlock port, I can see the silhouette of the antennas on top of the joint NASA/ESA Herschel Station a few clicks from here, but there are no lights showing, which is really bad. The large commercial outpost Mars 1, which is run by South Asian and Latin American industrial consortiums, is thirty kilometers away below the

horizon, but there's been no visible activity — and that's where the trouble started, anyway.

Decisions about where to build the colonies were made by identifying locations with safe landing zones, favorable launch dynamics close to the equator, and, most importantly, reliable access to water. And they were clustered together for mutual support — a critical need in the early days when they couldn't just get a shopdrone to fly over with tech tools from an automated distribution center. Early crises and disasters were tackled together. Lessons learned in one colony were shared with the others, since help from Earth was months away.

As the colonies grew, we built efficient robots for extracting water from Martian soils and ice, condensers to pull water from the Martian atmosphere, and recyclers to recover water from our wastes. A few weeks ago, the colonies supported nearly eight thousand people — the result of years of growth, expansion, and out-migration from Earth. Nearly five hundred of them are like me: real Martians, the children of the earliest colonists.

But as time went on, and as the priority shifted from basic survival to expansion and rapid growth, a new challenge arose — we were running out of water. Mars is a virtual desert compared to the water riches of Earth, but there are still millions of cubic kilometers of water here, theoretically sufficient to support plenty of people. Like on Earth, however, that water is unevenly distributed in space and time. The northern and southern Martian polar caps have most of the water ice, but these resources require transporting ice or water a vast distance over the surface. Too impractical. My parents designed the best condensers to pull water from the atmosphere and all the colonies use them, but they can only satisfy a fraction of the demand. Water in Martian soils near the original landing sites has been mined for years and isn't replenished naturally, so our extractors have been forced to venture farther and farther out for decent concentrations of subsurface moisture. The nearest large deposits of brines and ice found in craters and in shallow soils have long since been mapped and consumed. Nearly 100 percent of the water used in the living quarters, in waste products, laboratories, and food-growing facilities is already routinely recovered, purified, and reused.

The lead-up to the water war was subtle, though I guess the warning signs were there to see. Hindsight's a bitch. Our colony stopped accepting

applications for new immigrants from Earth as internal population growth rates accelerated. The market for trading water, methane, hydrogen, and oxygen among the colonies contracted and then collapsed. Research priorities and energy shifted from basic science and habitat engineering to the search for ice and water and the design of improved technologies for efficient water extraction and reuse.

The first crisis began a cycle ago, when the Mars 1 commercial colony suffered a catastrophic failure of its atmospheric condensers following that big dust storm. When repairs took too long and surplus water wasn't available from the other colonies, water shortages began to threaten their survival. When Mars 1's hydroponics began to collapse, we offered to help with repairs, but instead they sent a raiding party to tap into Herschel's storage tanks and took thousands of liters of water. Diplomatic negotiations smoothed over this first hostile act and the water debt was eventually repaid, but distrust escalated.

As tensions grew, joint research and scientific missions came to a halt, replaced by competition and secrecy. I know we're not blameless here. The crisis worsened when components for repairing our own ice miners were lost in back-to-back launch failures from Earth, and I heard rumors that some of our engineers pilfered parts from other colonies' ice rovers. The Herschel colonists wouldn't share the deep brine layer they found near their monument to the Curiosity rover. Someone smuggled weapons onto supply shipments from Earth and attacks on remote water collection and mining outposts increased.

Our disaster came quickly, like most disasters here. Someone — probably some lame-ass engineer from Mars 1 — tried to steal cryogenic methane propellant, produced from Martian water and carbon dioxide, out of our main storage tank next to my wing. I heard the pressure seals rupture and then the tank exploded, causing catastrophic decompression in my section. My emergency suit saved me, and I followed protocols. I sealed what I could, but it left me alone in this wing, and now I'm dying in a crappy old airlock and writing stupid notes on my tab.

If you're reading this, you'll know what I know. Tell my story. (But leave out the part about wanting to kiss Qing Yuan. If he's still alive, he'll just be embarrassed. I shouldn't have keyed that in.)

Final Summary from the Joint Investigative Report (2116):

Given the fragility of our Martian communities, the loss of life was stunning — by far the worst tragedy in the history of human space exploration and expansion, with 150 dead, including 12 of our precious children. If not for the fast actions of Jiang Ying Yue, who sealed off her damaged dome, hundreds more might have died.

But the shock of this disaster had a positive outcome. Immediate joint search and rescue teams found and saved survivors. Medical and engineering teams from all the colonies worked to repair the damages and to support the injured. Diplomatic negotiations between leaders from each colony with mediation from representatives of the international space programs helped reduce tensions. A joint cargo mission carrying water extraction and recovery technology, along with emergency medical and food supplies, was launched on a high-acceleration, short-duration flight, reaching the colonies in forty days.

In the longer term, negotiations led to the first Mars Water Treaty — a formal agreement governing the sharing of Martian water resources, including the open exchange of data and information about Martian water resources, plus planning guidelines for any new colonies. The colonies were demilitarized and commitments signed to prevent any future violence. Most critically, the Sol Systemwide Water Accord was created, laying down the rules and groundwork for careful, integrated management of water resources throughout the solar system, including by the joint expeditions now heading for the asteroid belt, the moons of Jupiter and Saturn, and beyond.

Finally, and unexpectedly, the Martian Water War led to changes in the planning and management of water back on Earth where, despite its water riches, competition and conflict over freshwater resources still occur, and where efforts to provide safe water for all Earth's inhabitants are still needed.

