The employees of Deyo Plastics worked double shifts to finish the Hab canvas for Ares 3. There was talk of triple shifts, if NASA increased the order again. No one minded. The overtime pay was spectacular, and the funding was limitless.

Woven carbon thread ran slowly through the press, which sandwiched it between polymer sheets. The completed material was folded four times and glued together. The resulting thick sheet was then coated with soft resin and taken to the hot-room to set.

LOG ENTRY: SOL 114

Now that NASA can talk to me, they won't shut the hell up.

They want constant updates on every Hab system, and they've got a room full of people trying to micromanage my crops. It's *awesome* to have a bunch of dipshits on Earth telling me, a botanist, how to grow plants.

I mostly ignore them. I don't want to come off as arrogant here, but I'm the best botanist on the planet.

One big bonus: e-mail! Just like the days back on *Hermes*, I get data dumps. Of course, they relay e-mail from friends and family, but NASA also sends along choice messages from the public. I've gotten e-mail from rock stars, athletes, actors and actresses, and even the President.

One of them was from my alma mater, the University of Chicago. They say once you grow crops somewhere, you have officially "colonized" it. So technically, I colonized Mars.

In your *face*, Neil Armstrong!

But my favorite e-mail was the one from my mother. It's exactly what you'd expect. Thank God you're alive, stay strong, don't die, your father says hello, etc.

I read it fifty times in a row. Hey, don't get me wrong, I'm not a mama's boy or anything. I'm a full-grown man who only occasionally wears diapers (you have to in an EVA suit). It's totally manly and normal for me to cling to a letter from my mom. It's not like I'm some homesick kid at camp, right?

Admittedly, I have to schlep to the rover five times a day to check e-mail. They can get a message from Earth to Mars, but they can't get it another ten meters to the Hab. But hey, I can't bitch. My odds of living through this are way higher now.

Last I heard, they'd solved the weight problem on Ares 4's MDV. Once it lands here, they'll ditch the heat shield, all the life support stuff, and a bunch of empty fuel tanks. Then they can take the seven of us (Ares 4's crew plus me) all the way to Schiaparelli. They're already working on my duties for the surface ops. How cool is that?

In other news, I'm learning Morse code. Why? Because it's our backup communications system. NASA figured a decades-old probe isn't ideal as a sole means of communication.

If *Pathfinder* craps out, I'll spell messages with rocks, which NASA will see with satellites. They can't reply, but at least we'd have one-way communication. Why Morse code? Because making dots and dashes with rocks is a lot easier than making letters.

It's a shitty way to communicate. Hopefully it won't come up.

All chemical reactions complete, the sheet was sterilized and moved to a clean room. There, a worker cut a strip off the edge, divided it into squares, and put each through a series of rigorous tests.

Having passed inspection, the sheet was then cut to shape. The edges were folded over, sewn, and resealed with resin. A man with a clipboard made final inspections, independently verifying the measurements, then approved it for use.

The meddling botanists have grudgingly admitted I did a good job. They agree I'll have enough food to last till Sol 900. Bearing that in mind, NASA has fleshed out the mission details of the supply probe.

At first, they were working on a desperate plan to get a probe here before Sol 400. But I bought another five hundred sols of life with my potato farm, so they have more time to work on it.

They'll launch next year during the Hohmann Transfer Window, and it'll take almost nine months to get here. It should arrive around Sol 856. It'll have plenty of food, a spare oxygenator, water reclaimer, and comm system. Three comm systems, actually. I guess they aren't taking any chances, what with my habit of being nearby when radios break.

Got my first e-mail from *Hermes* today. NASA's been limiting direct contact. I guess they're afraid I'll say something like "You abandoned me on Mars, you assholes!" I know the crew was surprised to hear from the Ghost of Mars Missions Past, but c'mon! I wish NASA was less of a nanny sometimes. Anyway, they finally let one e-mail through from the Commander:

> Watney, obviously we're very happy to hear you survived. As the person responsible for your situation, I wish there was more I could do to directly help. But it looks like NASA has a good rescue plan. I'm sure you'll continue to show your incredible resourcefulness and get through this. Looking forward to buying you a beer back on Earth.
>
> —Lewis

My reply:

> Commander, pure bad luck is responsible for my situation, not you. You made the right call and saved everyone else. I know it must have been a tough decision, but any analysis of that day will show it was the right one. Get everyone else home and I'll be happy.
>
> I will take you up on that beer, though.
>
> —Watney

The employees carefully folded the sheet and placed it in an argon-filled airtight shipping container. The man with the clipboard placed a sticker on the package. "Project Ares 3; Hab Canvas; Sheet AL102."

The package was placed on a charter plane and flown to Edwards Air Force Base in California. It flew abnormally high, at great cost of fuel, to ensure a smoother flight.

Upon arrival, the package was carefully transported by special convoy to Pasadena. Once there, it was moved to the JPL Spacecraft Assembly Facility. Over the next five weeks, engineers in white bodysuits assembled Presupply 309. It contained AL102 as well as twelve other Hab Canvas packages.

LOG ENTRY: SOL 116

It's almost time for the second harvest.

Ayup.

I wish I had a straw hat and some suspenders.

My reseed of the potatoes went well. I'm beginning to see that crops on Mars are extremely prolific, thanks to the billions of dollars' worth of life support equipment around me. I now have four hundred healthy potato plants, each one making lots of calorie-filled taters for my dining enjoyment. In just ten days they'll be ripe!

And this time, I'm not replanting them as seed. This is my food supply. All natural, organic, Martian-grown potatoes. Don't hear that every day, do you?

You may be wondering how I'll store them. I can't just pile them up; most of them would go bad before I got around to eating them. So instead, I'll do something that wouldn't work at all on Earth: throw them outside.

Most of the water will be sucked out by the near-vacuum; what's left will freeze solid. Any bacteria planning to rot my taters will die screaming.

In other news, I got an e-mail from Venkat Kapoor:

Mark, some answers to your earlier questions:

No, we will not tell our Botany Team to "Go fuck themselves." I understand you've been on your own for a long time, but we're in the loop now, and it's best if you listen to what we have to say.

The Cubs finished the season at the bottom of the NL Central.

The data transfer rate just isn't good enough for the size of music files, even in compressed formats. So your request for "Anything, oh God, ANYTHING but Disco" is denied. Enjoy your boogie fever.

Also, an uncomfortable side note…NASA is putting together a committee. They want to see if there were any avoidable mistakes that led you to being stranded. Just a heads-up. They may have questions for you later on.

Keep us posted on your activities.

—Kapoor

My reply:

Venkat, tell the investigation committee they'll have to do their witch hunt without me. And when they inevitably blame Commander Lewis, be advised I'll publicly refute it. I'm sure the rest of the crew will do the same.

Also, please tell them that each and every one of their mothers is a prostitute.

—Watney

PS: Their sisters, too.

The presupply probes for Ares 3 launched on fourteen consecutive days during the Hohmann Transfer Window. Presupply 309 was launched third. The 251-day trip to Mars was uneventful, needing only two minor course adjustments.

After several aerobraking maneuvers to slow down, it made its final descent toward Acidalia Planitia. First, it endured reentry via a heat shield. Later, it released a parachute and detached the now-expended shield.

Once its onboard radar detected it was thirty meters from the ground, it cut loose the parachute and inflated balloons all around its hull. It fell unceremoniously to the surface, bouncing and rolling, until it finally came to rest.

Deflating its balloons, the onboard computer reported the successful landing back to Earth.

Then it waited twenty-three months.

LOG ENTRY: SOL 117

The water reclaimer is acting up.

Six people will go through 18 liters of water per day. So it's made to process 20. But lately, it hasn't been keeping up. It's doing 10, tops.

Do I generate 10 liters of water per day? No, I'm not the urinating champion of all time. It's the crops. The humidity inside the Hab is a lot higher than it was designed for, so the water reclaimer is constantly filtering it out of the air.

I'm not worried about it. If need be, I can piss directly onto the plants. The plants will take their share of water and the rest will condense on the walls. I could make something to collect the condensation, I'm sure. Thing is, the water can't go anywhere. It's a closed system.

Okay, *technically* I'm lying. The plants aren't entirely water-neutral. They strip the hydrogen from some of it (releasing the oxygen) and use it to make the complex hydrocarbons that are the plant itself. But it's a very small loss and I made like 600 liters of water from MDV fuel. I could take *baths* and still have plenty left over.

NASA, however, is absolutely shitting itself. They see the water reclaimer as a critical survival element. There's no backup, and they think I'll die instantly without it. To them, equipment failure is terrifying. To me, it's "Tuesday."

So instead of preparing for my harvest, I have to make extra trips to and from the rover to answer their questions. Each new

message instructs me to try some new solution and report the results back.

So far as we've worked out it's not the electronics, refrigeration system, instrumentation, or temperature. I'm sure it'll turn out to be a little hole somewhere, then NASA will have four hours of meetings before telling me to cover it with duct tape.

Lewis and Beck opened Presupply 309. Working as best they could in their bulky EVA suits, they removed the various portions of Hab canvas and laid them on the ground. Three entire presupply probes were dedicated to the Hab.

Following a procedure they had practiced hundreds of times, they efficiently assembled the pieces. Special seal-strips between the patches ensured airtight mating.

After erecting the main structure of the Hab, they assembled the three airlocks. Sheet AL102 had a hole perfectly sized for Airlock 1. Beck stretched the sheet tight to the seal-strips on the airlock's exterior.

Once all airlocks were in place, Lewis flooded the Hab with air and AL102 felt pressure for the first time. Lewis and Beck waited an hour. No pressure was lost; the setup had been perfect.

LOG ENTRY: SOL 118

My conversation with NASA about the water reclaimer was boring and riddled with technical details. So I'll paraphrase it for you:

Me: "This is obviously a clog. How about I take it apart and check the internal tubing?"

NASA: (after five hours of deliberation) "No. You'll fuck it up and die."

So I took it apart.

Yeah, I know. NASA has a lot of ultra-smart people and I should really do what they say. And I'm being too adversarial,

considering they spend all day working on how to save my life.

I just get sick of being told how to wipe my ass. Independence was one of the qualities they looked for when choosing Ares astronauts. It's a thirteen-month mission, most of it spent many light-minutes away from Earth. They wanted people who would act on their own initiative.

If Commander Lewis were here, I'd do whatever she said, no problem. But a committee of faceless bureaucrats back on Earth? Sorry, I'm just having a tough time with it.

I was really careful. I labeled every piece as I dismantled it, and laid everything out on a table. I have the schematics in the computer, so nothing was a surprise.

And just as I'd suspected, there was a clogged tube. The water reclaimer was designed to purify urine and strain humidity out of the air (you exhale almost as much water as you piss). I've mixed my water with soil, making it mineral water. The minerals built up in the water reclaimer.

I cleaned out the tubing and put it all back together. It completely solved the problem. I'll have to do it again someday, but not for a hundred sols or so. No big deal.

I told NASA what I did. Our (paraphrased) conversation was:

Me: "I took it apart, found the problem, and fixed it."

NASA: "Dick."

AL102 shuddered in the brutal storm. Withstanding forces far greater than it was designed for, it rippled violently against the airlock seal-strip. Other sections of canvas undulated along their seal-strips together, acting as a single sheet, but AL102 had no such luxury. The airlock barely moved, leaving AL102 to take the full force of the tempest.

The layers of plastic, constantly bending, heated the resin from pure friction. The new, more yielding environment allowed the carbon fibers to separate.

AL102 stretched.

Not much. Only four millimeters. But the carbon fibers, usually 500 microns apart, now had a gap eight times that width in their midst.

After the storm abated, the lone remaining astronaut performed a full inspection of the Hab. But he didn't notice anything amiss. The weak part of canvas was concealed by a seal-strip.

Designed for a mission of thirty-one sols, AL102 continued well past its planned expiration. Sol after sol went by, with the lone astronaut traveling in and out of the Hab almost daily. Airlock 1 was closest to the rover charging station, so the astronaut preferred it to the other two.

When pressurized, the airlock expanded slightly; when depressurized, it shrunk. Every time the astronaut used the airlock, the strain on AL102 relaxed, then tightened anew.

Pulling, stressing, weakening, stretching…

LOG ENTRY: SOL 119

I woke up last night to the Hab shaking.

The medium-grade sandstorm ended as suddenly as it began. It was only a category three storm with 50 kph winds. Nothing to worry about. Still, it's a bit disconcerting to hear howling winds when you're used to utter silence.

I'm worried about *Pathfinder*. If the sandstorm damaged it, I'll have lost my connection to NASA. Logically, I shouldn't worry. The thing's been on the surface for decades. A little gale won't do any harm.

When I head outside, I'll confirm *Pathfinder*'s still functional before moving on to the sweaty, annoying work of the day.

Yes, with each sandstorm comes the inevitable Cleaning of the Solar Cells, a time-honored tradition among hearty Martians such as myself. It reminds me of growing up in

Chicago and having to shovel snow. I'll give my dad credit; he never claimed it was to build character or teach me the value of hard work.

"Snowblowers are expensive," he used to say. "You're free."

Once, I tried to appeal to my mom. "Don't be such a wuss," she suggested.

In other news, it's seven sols till the harvest, and I still haven't prepared. For starters, I need to make a hoe. Also, I need to make an outdoor shed for the potatoes. I can't just pile them up outside. The next major storm would cause the Great Martian Potato Migration.

Anyway, all that will have to wait. I've got a full day today. After cleaning the solar cells, I have to check the whole solar array to make sure the storm didn't hurt it. Then I'll need to do the same for the rover.

I better get started.

•••

AIRLOCK 1 SLOWLY depressurized to 0.006 atmospheres. Watney, wearing an EVA suit, stood inside it waiting for the cycle to complete. He had done it literally hundreds of times. Any apprehension he may have had on Sol 1 was long gone. Now it was merely a boring chore before exiting to the surface.

As the depressurization continued, the Hab's atmosphere compressed the airlock, and AL102 stretched for the last time.

On Sol 119, the Hab breached.

The initial tear was less than one millimeter. The perpendicular carbon fibers should have prevented the rip from growing. But countless abuses had stretched the vertical fibers apart and weakened the horizontal ones beyond use.

The full force of the Hab's atmosphere rushed through the breach. Within a tenth of a second, the rip was a meter long, running parallel to the seal-strip. It propagated all the way

around until it met its starting point. The airlock was no longer attached to the Hab.

The unopposed pressure launched the airlock like a cannonball as the Hab's atmosphere explosively escaped through the breach. Inside, the surprised Watney slammed against the airlock's back door with the force of the expulsion.

The airlock flew forty meters before hitting the ground. Watney, barely recovered from the earlier shock, now endured another as he hit the front door, face-first.

His faceplate took the brunt of the blow, the safety glass shattering into hundreds of small cubes. His head slammed against the inside of the helmet, knocking him senseless.

The airlock tumbled across the surface for a further fifteen meters. The heavy padding of Watney's suit saved him from many broken bones. He tried to make sense of the situation, but he was barely conscious.

Finally done tumbling, the airlock rested on its side amid a cloud of dust.

Watney, on his back, stared blankly upward through the hole in his shattered faceplate. A gash in his forehead trickled blood down his face.

Regaining some of his wits, he got his bearings. Turning his head to the side, he looked through the back door's window. The collapsed Hab rippled in the distance, a junkyard of debris strewn across the landscape in front of it.

Then, a hissing sound reached his ears. Listening carefully, he realized it was not coming from his suit. Somewhere in the phone booth–sized airlock, a small breach was letting air escape.

He listened intently to the hiss, then he touched his broken faceplate. Then he looked out the window again.

"You fucking kidding me?" he said.