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Martian Chronicle

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Martian Chronicle

Mars may well be the next great frontier. But what kind of world should we make there?

By John Tierney

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A couple of years ago, after hearing an engineer named Robert Zubrin rhapsodize about his plan for a privately financed expedition to Mars, I tried out the idea on America's masters of marketing. I sent an outline of the scheme to Bill Gates, Ted Turner, Barry Diller, Peter Uberroth, television executives such as ABC's Roone Arledge and NBC's Don Ohlmeyer, the leaders of DreamWorks, and a long list of other people whose names tend to be accompanied by the word visionary. I wasn't asking for money, just for their thoughts on how humanity's interplanetary adventure could be packaged profitably, but most of them didn't even want to think about it. Except for a few enthusiasts, they couldn't imagine how you could make the trip interesting enough to pay the bills. How could you hold the audience for such a long trip to such a desolate place?

"Personally," Barry Diller explained, "I don't care about going to Mars."

Personally, I did. But I didn't presume to know as much about the mass audience as Diller and his fellow moguls. They knew how short the public's attention span could be; they remembered how quickly people had gotten bored with the Apollo program. What, really, was the point of going to Mars? If the idea made any commercial sense, why wasn't someone working on it? I wondered if Zubrin was hopelessly unrealistic--until this past summer, when he managed to get 700 people from 40 countries to travel to Boulder, Colorado.

Officially, it was the founding convention of the Mars Society. Unofficially, it was the Woodstock of Mars, a horde of scientists, entrepreneurs, schoolteachers, lawyers, writers, engineers, college students, musicians, computer geeks, and assorted hustlers wearing "MARS OR BUST" buttons. They ranged from space hobbyists to the president of a company working on a privately financed mission to survey an asteroid. They debated the cost of spaceships and whether to power the Mars land rover with a nuclear reactor. They bought Mars trinkets and pictures. They analyzed details ranging from the proper Martian calendar (there are dozens of competing systems) to the mechanics of creating a breathable atmosphere on Mars.

And they cheered Zubrin, who is one of the more riveting engineer-orators in history. A short man with intense dark eyes and a passionate speaking style--he can bring to mind Savonarola--he railed at the stagnation that would afflict humans without a frontier to conquer. He extolled the Europeans who crossed the Atlantic 500 years ago to find freedom in the New World and the Africans who left the comforts of the tropics 50,000 years ago for the cold, harsh regions where they were forced to develop the tools that made civilization possible. "Humans did not leave paradise because they ate of the tree of knowledge," he proclaimed. "They ate of the tree of knowledge because they left paradise." The audience gave him a two-minute standing ovation.

In some ways it was reminiscent of the passion for space back in the 1960s, but not even the moon landings had ever aroused such a zealous corps of volunteer mission planners. These people wanted much more than another Apollo program, whose achievements they dismissed as "flags and footprints." Their heroes were from earlier eras of exploration: Columbus, the Pilgrims, Lewis and Clark, the settlers of the American West. As they put it in their society's founding declaration, "The settling of the Martian New World is an opportunity for a noble experiment in which humanity has another chance to shed old baggage and begin the world anew."

They were dangerously close to utopianism--which at first seemed odd, given that Zubrin and a good many of the others are libertarians. Ordinarily, libertarians are too busy opposing politicians' utopian schemes to be preaching their own. But as they fantasized about casting off the chains of earthly governments, the Mars-libertarian connection began to make sense. Mars gives libertarians a rare chance to be for something, to present a grand vision of freedom instead of merely trying to fend off the latest excesses of big government. Building the future is a splendid alternative to the drudgery of deregulating and privatizing the present. Spaceships and extraterrestrial colonies evoke the sort of emotions inspired by cathedrals in the Middle Ages--or, to use a more recent example, by modern architecture in The Fountainhead.

Libertarians can appreciate Mars in a way that Barry Diller and his fellow moguls can't. A desolate planet free of earthly institutions is more appealing to libertarians than it is to the corporate elite, just as the New World was more appealing to the Pilgrims and other contrarians than it was to the European aristocracy. It will take some doing to settle Mars, but libertarians have a crucial advantage. They're not expecting government bureaucrats to do the job. They know better than to count on NASA.

Four decades after the Lewis and Clark expedition, the American West had been mapped by trappers and was being rapidly settled by farmers. It has now been nearly four decades since the first explorers went into space, and what do we have to show for it? Chiefly two government programs that have created lots of jobs and produced massive cost overruns: the space shuttle and the space station. Rick Tumlinson, the president of the Space Frontier Foundation, is grateful that NASA did not exist in Thomas Jefferson's day.

"Suppose," Tumlinson says, "that when Lewis and Clark returned from their trip, Jefferson had told them, 'Mr. Clark, you develop a Conestoga shuttle. Mr. Lewis, I want you to build a national cabin.' And 30 years later they had three or four Conestoga shuttles, and they were just beginning to build the

national cabin. That's where we are today."

Admittedly, space poses more logistical challenges than the American West. But NASA has shown a genius for complicating those challenges. It is burdened not only by bureaucratic inefficiency and pork barrel politics (every superfluous job means votes in someone's congressional district) but also by the public's aversion to risk. Private explorers can afford to fail and risk lives; NASA's leaders are expected by politicians and the press to prevent any loss of life or damage to "national prestige." They're forced to avoid another Challenger disaster at all costs.

"The cost of space travel ought to be declining with new technology, but it's not," says Edward L. Hudgins, director of regulatory studies at the Cato Institute. "About three decades after the Wright brothers' flight, the commercially viable DC-3 was flying. But today the cost of placing payloads into orbit on the shuttle is 10 times higher than it was during the Apollo program. By contrast, in the past 20 years the cost of airline tickets per passenger mile has dropped by 30 percent, and the cost of shipping oil has dropped 80 percent."

NASA's profligacy became absurdly obvious in 1989, when the agency was asked by President Bush to plan a mission to Mars. It responded with a $400 billion proposal to build a 1,000-ton interplanetary spaceship the length of a football field, which would have carried all the fuel for the return voyage. It would have been assembled in orbit because it was too large to be launched from Earth--"the battlestar Galactica," as Zubrin dubbed it. At the time he was an engineer at Martin Marietta Astronautics and a member of an informal group called the Mars Underground that met occasionally to dream of interplanetary travel. He and a colleague at Martin Marietta, Donald Baker, came up with an alternative to NASA's battlestar Galactica by adopting the philosophy of Roald Amundsen, the entrepreneurial Norwegian who explored the polar regions early this century.

Besides winning the race to the South Pole, Amundsen was the first person to sail the Northwest Passage, which he accomplished by avoiding the mistakes of the British Navy. As the NASA of its day, the Royal Navy in the 19th century sent one lavishly provisioned expedition after another in search of the Northwest Passage, but the large ships kept getting stuck in the Arctic ice, and when the food ran out the men had to return home (or perish, as many of them did). Amundsen, who was financing his own expedition, bought a small fishing boat and took a crew of just six. Unable to bring huge stores of food, he learned to live off the land by hunting caribou as he maneuvered the small boat through the ice all the way from the Atlantic to the Pacific.

"Amundsen's expedition was a brilliant example of a small group of explorers succeeding on a shoestring budget," Zubrin says. "Lewis and Clark's was another. Before their journey, armies with big baggage trains had failed to make any significant penetration in the American West. But Lewis and Clark managed to cross the continent with just 25 men."

To reach Mars, Zubrin proposed replacing NASA's huge ship with a vessel small and light enough to be launched directly from Earth. It would not need to carry fuel for the return trip because the Martian explorers, like Amundsen, would exploit local resources: the carbon dioxide in the Martian atmosphere, which when combined with hydrogen brought from Earth, could be converted to methane and liquid oxygen to fuel the return voyage. Zubrin built a machine to demonstrate how easily it could be done, and eventually NASA adopted his idea. It redesigned the Mars mission, lowering the cost estimate from $400 billion to $55 billion, and is contemplating a trip sometime after 2010.

But Zubrin, who's now the president of his own firm in Boulder, Pioneer Astronautics, has pared down NASA's plans to come up with a still cheaper mission. He figures that within a decade a private entrepreneur could get to Mars and back for a mere $5 billion. He's been promoting this idea in lectures and in a book, The Case for Mars, that has been translated into half a dozen languages and attracted letters from thousands of Mars enthusiasts around the world. (See "Spaceship Enterprise," April 1997.)

Other engineers estimate the cost of a private mission might be more like $10 billion, maybe up to $20 billion, but even at those prices the trip is not an absurdly extravagant dream. NASA's budget for a single year is $13 billion. For the estimated cost of building and operating the space station, $100 billion, you could send a fleet of Zubrin's ships to Mars. By NASA standards, the cost of a private Mars mission is chump change.

But by venture capital standards, it's a lot of money for a highly speculative endeavor. To pay for the mission, Zubrin and members of the Mars Society have been analyzing the financing techniques of pre-NASA explorers and looking for new ideas. Some possibilities:

The Mars Prize. Zubrin tried selling this idea during a dinner with then-House Speaker Newt Gingrich, who got so enthusiastic that the meal lasted for four hours. But Gingrich never followed through on the proposal, which calls for Congress to promise $20 billion to the first explorers who reach Mars and return. In case that prize isn't enough to interest entrepreneurs in such a risky all-or-nothing venture, Zubrin also envisions offering smaller bonuses for achieving technical milestones along the way, like sending the equipment for making fuel to Mars.

Prizes have been used in the past to spur public-private ventures in exploration. Fifteenth-century Spanish and Portuguese rulers offered financial inducements to captains who ventured down the African coast and across the Atlantic. In the 19th century, the British Parliament offered cash awards for reaching the North Pole and for venturing westward into the Arctic ice: a prize of [sterling]5,000 for reaching 110 degrees west, double that for reaching 130 degrees, and triple that for 150 degrees.

For politicians, the most appealing aspect of the Mars Prize is that they could reap the publicity of announcing it without having to pay for it immediately. They could present themselves as both patrons of exploration and opponents of make-work government programs. NASA would surely object to the proposal, and so might libertarian purists, who could argue that there's no need for the public to finance any kind of Martian adventure. But to some extent, the knowledge gained from Martian exploration would be a public good; so would the national glory, for whatever that's worth. And there's always the preservation-of-the-species argument: By supporting the exploration of a potential new home, the public is buying insurance against Earth's becoming uninhabitable.

The Mars Prize would certainly be more defensible than NASA's current monopoly on public funds for space exploration. Still, there's no reason the trip must be financed by the government. Entrepreneurial explorers have long profited from the fortunes and egos of...

Rich Patrons. In 1911, William Randolph Hearst offered a $50,000 prize to the first person to fly across America in less than 30 days. Calbraith Perry Rodgers immediately set out to win it in a plane called the Vin Fiz, named after a carbonated grape drink manufactured by his sponsor, the Armour Meat Packing Company. He endured 15 accidents on the way from New York to Los Angeles, one of which landed him in the hospital for a month. He didn't meet the deadline--it took him 84 days--but he did complete the trip. Other prizes have been offered for human-powered flight (a $200,000 award claimed in 1978, when the Gossamer Albatross flew a mile) and for the first manned, completely reusable spaceship (a $10 million award, announced in 1996 by the X Prize Foundation, that has yet to be claimed).

The Mars Prize would be an expensive proposition, but modern-day Hearsts such as Bill Gates could afford to offer it. Or they could directly finance expeditions, the way wealthy gentlemen supported polar exploration at the start of the century. Robert Peary, for instance, was bankrolled by the Peary Arctic Club, a group of businessmen who paid for the privilege of basking in his company and achieving geographic immortality. Peary and other polar explorers named mountains and glaciers after the American, British, and Norwegian

plutocrats who financed the discoveries. Mars' most prominent features, like its 18-mile-high volcano and 2,800-mile-long version of the Grand Canyon, have already been named, but the first explorers there--and certainly the first settlers--could exercise their prerogative to assign new names.

The patrons of Arctic expeditions also sometimes paid to tag along for part of the trip. Peary brought wealthy sponsors on his ship; Frederick C. Cook was accompanied by a sportsman who wanted to hunt. The Mars mission--six months traveling there, two years on the surface, and six months back--might be too grueling a vacation for the typical billionaire. But plenty of other people would pay for a chance to go along, and there's a clever way to get hold of their money.

The Mars Lottery. Perhaps the most promising new idea at the conference in Boulder came from someone outside the aerospace industry. Alex Duncan, a local resident with experience in the commodities business, proposed an international Mars Lottery, modeled on the lottery based in Lichtenstein that raises funds internationally for the Red Cross. A Mars Lottery could be headquartered anywhere and reach a global audience through the Internet.

Besides the usual cash prizes, which could be awarded fortnightly or monthly, the Mars Lottery would have two big selling points. First, participants would know that a portion of the proceeds was going to support a private expedition to Mars. Second, and more important, participants would be buying a chance to go themselves. Duncan proposed that all the winners of the regular drawings become eligible for a grand prize: a berth on the first ship to Mars, assuming that the winner of this grand drawing met the physical and mental requirements for the voyage. Duncan figures that the proceeds from this lottery could pay for the whole Mars mission within three to five years.

A variation on his scheme would be to give the winner of each regular drawing the option of trying out for the mission at the explorers' training camp, which would probably be in the Arctic (to simulate the frigid conditions on Mars). The leader of the crew could evaluate dozens, maybe hundreds, of different winners and choose one or two for the trip. This system would produce a better crew and also increase the appeal of the lottery, because each winner would be getting an Arctic adventure in addition to the cash prize.

Media and Marketing. The Summer Olympics last just three weeks and generate more than $2 billion in fees from television networks and corporate sponsors. The three-year Mars mission has the potential to make much more money, possibly enough to pay for itself, solely with the revenue from media rights and corporate tie-ins.

Just as Henry Morton Stanley charged the expenses of his African journeys to the New York Herald, just as Sir Ernest Shackleton paid for his Antarctic voyages with best-selling books and international lecture tours, the Mars explorers could tap into the global appetite for adventure stories. And just as Shackleton exploited the new media of his day--at his lectures in 1910 he showed the first movies from the Antarctic--the Mars explorers could reach a paying audience through new cable channels and Web sites. The media coverage of the mission would attract the same kind of sponsors who pay to be part of the Olympics. Outdoor gear makers and high-technology firms would have a special incentive to have their logos and products associated with the adventure.

Although some sponsors would be reluctant to get involved with a project that could fail spectacularly and fatally, others (especially those selling products to young males) would be attracted by the aura of danger. But the dangers must seem worthwhile; the mission shouldn't come off as a pointless stunt. If the trip appeared to be just a longer version of Apollo 11, another enterprise that left nothing but flags and footprints, it would be less appealing to the audience--and therefore to potential sponsors. That's one reason that Zubrin and his disciples focus on analogies with Columbus instead of Neil Armstrong. The vision of Mars as the New World lends the first trip gravitas.

But why would anyone, especially a libertarian devoted to free markets, believe that a Mars colony would be a good investment? The first humans on Mars will encounter horrific dust storms, temperatures of minus 70 degrees Fahrenheit, and an unbreathable atmosphere. If they stood on the Martian surface without a pressurized suit, their blood would expand and burst out of their veins. Why would it pay to stick around?

At first glance, Mars has none of the commercial opportunities that drew the first Europeans to America. Columbus, who was financed by merchants as well as by Queen Isabella, crossed the Atlantic with the intention of making money. Even after his first goal, a trade route to the Orient, proved unattainable, there were other attractions for investors. The Spanish conquered the natives and took home gold; the French and Dutch set up trading posts in North America to acquire furs.

Mars offers no such inducements, unless you count the souvenir value of its rocks. Otherwise the minerals in its crust appear to be of little value. Science fiction writers like to imagine humans profitably mining asteroids and other planets, but there's no looming scarcity of minerals on Earth. The prices of metals and most other natural resources have been falling for millennia. Unless the prices here rise dramatically, or the cost of interplanetary shipping plummets, space miners won't be able to profitably export Mars' resources in the foreseeable future.

But Mars does have some resources of local value: water, carbon dioxide, and real estate. It contains as much dry land as all the continents on Earth, and the leaders of the Mars Society have big plans for it. They want to "terraform" Mars by injecting chlorofluorocarbons into its atmosphere and setting off a runaway greenhouse effect. As the planet thawed, the atmosphere would thicken with carbon dioxide released from melting ice caps and soil. Add some trees and plants to convert the carbon dioxide into oxygen, and before long humans could be breathing comfortably as they strolled in shirt sleeves on the green planet.

This scheme sounds outlandish today, but there was a time when Europeans couldn't imagine settling the American wilderness either. The Spanish and French leaders, as well as the officials of the Dutch West India Company, didn't initially emphasize permanent settlements of families. They sent mainly single men--soldiers, traders, and trappers--on temporary assignments to extract resources. America was a nice place to exploit, but you wouldn't want to live there.

"From the Spanish point of view," Zubrin says, "the only parts of the Americas that were valuable were the places with civilized Indians that could be taxed. They dismissed the rest as a howling wilderness. The British had a different notion of where wealth comes from. They created farms and towns in New England, turning the wilderness into a domain where social reproduction could occur."

The British settlers, motivated by a yearning for religious freedom, eventually outnumbered and expelled the Spanish, French, and Dutch from most of North America. Isolated from Europe, they created new kinds of communities with new kinds of liberties. "Humanity needs room to play and experiment with ideas in human governance," Zubrin says. "In 1776 Thomas Paine wrote, 'We hold it in our power to begin the world anew.' So they did, and so do we. People will endure the risk and hardships of emigrating to Mars if, like the colonists in America, they can find a higher level of freedom."

Zubrin has come up with 16 new rights he would like to see on Mars, such as the right "to build, develop natural resources, and improve nature," and the right to practice an occupation without a license. "The Martian frontier could be like the frontier in the American West, where you didn't need a license to be a doctor," Zubrin says. "If you got good results, you had a clientele. If you had bad results, you were lynched."

His fellow libertarians have come up with their own bills of rights for Mars, which are being debated on the Mars Society's Web site (www.marssociety.org). What kind of property rights should there be on Mars? Should euthanasia and narcotics be legal? Do Earthlings even have the right to discuss the rights

of future Martians? There's a certain absurdity to the debate--and to the very existence of the Mars Law and Governance Task Group--but also a certain glamour. If you're going to conduct a theoretical argument about something as arcane as occupational licensing, you may as well set it in outer space.

Meanwhile, back on planet Earth, the more mundane question remains: Who pays for the first trip? At its founding convention, the Mars Society resolved to raise $1 million to establish its own training base in the Arctic, on Canada's Devon Island, and it's also planning to send its own instrument along on a NASA spacecraft in 2003.

"We might want to send along a balloon that will float above Mars with a camera attached to it," Zubrin says. "We could market that for its entertainment value and advertising revenue. Maybe you couldn't pay for the whole mission with that revenue, but the Mars Society membership would pay for the difference. It's the Jacques Cousteau model: You combine membership dues with commercial revenues from films and documentaries. As you take one little step after another; you build up your credibility to raise the $5 billion for the manned mission."

Already a few entrepreneurs are looking to launch their own missions into space. Two companies, hoping to tap the adventure travel market, have announced plans to build space planes that will take customers for a brief ride just outside the atmosphere. Another firm, Space Dev, has raised $20 million as part of its plan to send scientific instruments to survey an asteroid and sell the data to scientists. But the Mars mission requires investment of another order of magnitude, and even enthusiasts like Zubrin aren't sure the private sector will take the risk anytime soon. As he hopes for a private mission, he's also lobbying for an old-fashioned NASA program.

"I'm a hard libertarian about rights on Mars, but not about getting there," he says. "With something as risky as Mars, it would be useful for the government to absorb some of the up-front costs. Spanish merchants weren't willing to back Columbus' first trip without royal involvement. Lewis and Clark were funded by the U.S. government--and then, as soon as they came back and said there's beaver there, John Jacob Astor's people did their own private exploration that ultimately was much more extensive than the government's. The American government also stimulated the private sector by setting up forts in the frontier, which attracted peddlers who established trade routes in the area. If the government set up a research base on Mars, it would stimulate private competition to lower the costs of delivering cargo."

Once the cost of transport to Mars dropped, real estate speculators might begin to see the planet's potential. One member of the Mars Society, Richard Allen Brown, has proposed that a private company divide Mars into a million plots, each 25,000 acres, and sell bonds giving a 100-year option on each plot. By charging $20,000 for each bond, the company could raise $20 billion. It would invest this capital conservatively and use the income, about $1 billion a year, to finance the exploration and settlement of Mars over the course of a century. If you bought a bond and the land eventually became valuable, you (or your heir) could exercise the option to trade in the bond for a deed to the land. If after 100 years the option still hadn't been exercised, your heir could redeem the bond for the original capital investment of $20,000.

Mars bonds would not be for the timid investor. Even if the land did become valuable, there's no guarantee that your deed to the land would be recognized, because for now there's no internationally recognized method of claiming land in outer space. The vagaries of space property law make a another great topic of discussion among Mars Society members. (See "A Little Piece of Heaven," November.) But then, the first investors in the New World did not have secure property rights either.

"People in England were buying and selling Kentucky back in the 1600s, when it might as well have been Mars," Zubrin says. "No British citizen had been there, and it wasn't clear that British law would prevail--the French and Spanish had claims there too. But the king of England would sell patents to a

nobleman, who would sell pieces to capitalists willing to speculate on the British. They'd hire someone to survey it, and then, if there were good prospects, they'd sell the land at a profit or start developing it by sending in settlers."

It's conceivable that the interplanetary version of the French and Indian War would be a conflict between rival companies or countries trying to claim Martian real estate. Perhaps more likely, the war could pit speculators against those who wanted to preserve Mars from capitalist development. Already a handful of countries (not including the United States) have signed a treaty declaring all extraterrestrial bodies to be "the common heritage of mankind," as Antarctica is treated today. The scientists who are now fighting to keep Antarctica pristine--which generally means excluding every money-making activity except for their research projects--would probably try to preserve Mars for themselves too. Environmentalists who now demand the preservation of malarial swamps and frozen tundras probably would find reason to preserve Mars in its "natural" state.

In fact, Zubrin's development plans even provoked some opposition at the founding convention of the Mars Society. Environmentalists in the audience rose to object when he declared it our species' Manifest Destiny to terraform the Martian environment. But Zubrin managed to quell the opposition, and get another ovation, by explaining that the Red Planet would become a green haven for terrestrial species whose habitat might one day be endangered.

"We must protect billions of our fellow creatures," he said. "Raccoons and maple trees can't get to Mars on their own. We have to help them there. Humans have eaten a lot of fish, and now we're going to repay the favor by taking fish to Mars. It's our duty to the biosphere."

It was a lovely moment, a developer outgreening environmentalists by nobly espousing the largest real estate project in history, and it illustrated why Mars is a no-lose proposition for libertarians. If colonizing the Red Planet ever becomes a practical possibility, we should be ready to get there before anyone else starts writing the rules. And even if colonization never becomes practical, even if Mars never becomes a free new world, just imagining it is good for the libertarian soul.

John Tierney is a columnist for The New York Times.

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