SAND TRAP ENDS MARS ROVER'S STELLAR ROUND

Surely, a golfer's worst nightmare would be to spend eternity in a sand trap. This cruel fate is now being experienced by NASA's Spirit Rover, which was sent to Mars seven years ago and given up for dead in May. Aside from what might strike you as robotic cruelty, I ask that you join me in celebrating the work of our federally funded scientists and engineers in achieving this feat.

Imagine you're out there on the back nine, all alone. Yours is no ordinary course with open fairways and gentle slopes. Instead, it's a nightmare of rock, rubble and dust.

Despite clear sunshine, it's colder than an Antarctic dawn, and dry enough drive you to drink. While searching for that water station, you find yourself in a sand trap like no other. It's soft and powdery. Swing after swing gets you nowhere. Slowly you sink to your ankles.

In desperation, you phone a friend, but your cellphone battery is too weak to transmit. While drifting toward unconsciousness, you remember with a tinge of jealousy that your twin is happily playing on the other side of the course. Resigned to fate, you look back on a good last round.

This fictional golf nightmare follows the nonfiction plot of Spirit Rover's final round. It arrived on Mars on Jan. 3, 2004, the year in which the Red Sox won their first World Series since 1918, George Bush was elected president without Supreme Court intervention and the war in Iraq was getting uglier.

Spirit's twin, Opportunity, was landing on the other side of the red planet. Together, their mission was to explore their respective localities to reconstruct the planetary history of Mars, with a special goal of finding evidence of liquid water.

Each had six wheels and weighed about 400 pounds. Think of them as weird-looking, solar-powered golf carts.

In the place of human drivers, they had robotic geologists with panoramic 3-D cameras. Instead of clubs, each was equipped with a variety of drills, mechanical sampling arms and on-board laboratories for chemical analyses. Using digital photos beamed back to earth, NASA controllers guided them to interesting-looking places and had them sample Mars in much the same way geologists would sample rocks on Earth in search of ancient life, or the liquid water that might have once supported it.

Spirit succeeded in finding evidence for conditions suitable for life, even after breaking a wheel and being forced to travel backward. In a scenario analogous to sinking an impossible putt after a tough shot from the rough, it detected the presence of amorphous silica in a sample exposed by dragging its lame wheel. That substance confirmed the former presence of liquid water in a geothermal setting similar to that which supports microbial life in Yellowstone National Park today.

On earthly golf courses, sand traps are sharp-edged depressions cut into firm sod and filled with soft sand. On Mars, the trap was Gusev Crater, and the dusty sand was too soft to give it traction. There, this otherwise agile, come-from-behind winner, spun its wheels, even as NASA engineers pulled every club from its bag of options. But there it remained, stuck in the sand like an inexperienced player who swings, over and over, without result. Eventually, Spirit stopped communicating. Finally, after nearly a year of faint hope, NASA staff members gave up.

This tough little robot was designed to last only a few months and to travel only a few hundred yards. Miraculously, it ran like an Energizer Bunny, lasting more than five years, covering more than five
miles of Martian terrain and sending back a treasure chest of imagery and data that have helped us understand our own situation here on Earth.

Though Spirit's nightmare is over, its twin rover, Opportunity will play on through the summer. What fun.