# Drover

A hundred years ago, the New United Nations debated the issue of water resources for Earth and they reached several conclusions: first, converting ocean water to tap water was too expensive to be practical; second, we had to find a new source of fresh water, most likely from outer-space and third, Earth had only 1,000 years of fresh water left because of the rapid melting of the polar ice caps, so something had to be done quickly – after all, once fresh water is mixed into the ocean, it's lost forever.

Astronomers suggested capturing comets and letting them melt in the atmosphere and rain down on Earth from the stratosphere, but physicists argued that 99.9% of the water would become unusable due to the great heat of deceleration, and worse, the H2O bonds would be broken and the upper atmosphere would be loaded with dangerous free-oxygen atoms, which would bond with all kinds of stuff to make a very dangerous goop that would eventually block the sun, and cool the planet. Also, the comet samples that had been returned to Earth contained many undesirable substances that could cause dangerous pollution on Earth. Astronomers also refused to sign off on the idea because comets are too rare in the inner solar system, and harvesting them from the Oort cloud or the Kuiper Belt would take too much energy to be practical. Plus, controlling the orbit of a huge chunk of ice on a 400 year journey to Earth was a problem that nobody wanted to take on, because even a slight orbital miscalculation would result on death for all.

In 2205, Liu Qong, a quiet Chinese professor at the University of Alabama, suggested moving Ganymede. "First, it has plenty of water, more than the human race can ever use. And second, we can put it into Laplace resonance with Luna, so it will merely be another object in our night sky. Ganymede is larger than Luna, so we can put it farther out, maybe 1,000,000 kilometers, compared to Luna's orbit of 400,000 kilometers, so it won't affect Earth's tides very much. Harvesting ice from that distance is practical on a long-term basis. Did you know that the Chinese astronomer Gan De first discovered Ganymede in 365 B.C.? Here is my paper on the subject."

Astronomers, physicists and the rest of Earth's population laughed at the idea, and then they realized that it just might prevent the demise of humanity. News outlets started publishing excerpts from professor Liu's paper, dressed up with fancy graphics and lots of notes. It wasn't so hard to understand the ideas involved: move a moon with a mass of 1.5 x 10^23 kilograms from Jupiter to Earth, that's all. Scientists began working the calculations. What size rockets would it take? How to control that much mass over that great distance? What would be the consequences of the new moon's orbit on Earth?

Professor Sam Browne from the University of Arizona almost stopped the process entirely when he concentrated on the problem of "What will happen to Jupiter if we steal Ganymede?" It wouldn't affect Jupiter so much, because of its great mass, compared to Ganymede, but the orbital mechanics of Jupiter's other moons was another story. Europa and Io are in orbital resonance with Ganymede, and moving Ganymede would cause their orbits to become chaotic. Either they'd eventually crash into Jupiter, or they'd be flung off in some unpredictable direction, and cause great damage to whatever they finally hit. The news media called this "The Great Problem."

The other great problem was "How do we move that much mass with great precision?" That problem was sorted out and simulated on the world's super-computers. Finally, the N.U.N. scientists agreed that it was possible.

So the only problem left was The Great Problem. Scientists and world leaders discussed and debated for years, and nearly reached consensus. The fact that Jupiter has no life and that the continuation of life

on Earth was particularly important: Ganymede should be moved as soon as possible. That was 100 years ago.

So that's why I'm here, like a drover in the far Outback of space, herding a huge chunk of frozen water into Earth-orbit. The entire process will take 751 years, so I'm just a small part of the solution. Every day in my ship named Scout, I circumnavigate Ganymede, looking for strays – bits of rock and ice larger than 50 feet which might eventually slam down onto Earth, and I zap them to smithereens with a powerful laser. We'll be crossing the orbit of Mars in a few years, and I watch it in my telescope every night. My measurements are merged with Earth-based measurements to make sure that the gravitational pull of Mars on Ganymede won't cause orbital drift, which would be catastrophic.

And every night when I make my observations, I see a blue dot move a little more against the pure black curtain of pin-point stars in our little corner of the Milky Way. Sometimes I crank my telescope up to maximum, and sometimes, rarely...rarely, I can make out Australia, the lucky country, my homeland. I know how badly my people have suffered with water shortages for hundreds of years, and so I really know the value of what I'm gifting them. Sometimes I do trivial ion-rocket burns to correct the orbital injection parameters, but mostly I wait for the next rocket from Earth to bring me air, food and water. In another 9 years and 3 months, my replacement will arrive – I guess I'm getting a bit old to ride the far Outback much more. Yes, friends, it's a great life, the life of the drover.