Zero Waste Institute Newsletter

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FIRST DESIGNS ARE WORST DESIGNS

Human thinking is no better than it is. When faced with a new problem, the first idea for a solution is often whatever happens to be on our mind. And if the solution sort of works, we usually stop there until it stops working. Some really awful behaviors have arisen this way, and they bedevil us for decades or centuries until they become so destructive that we go out searching for the better way that we should have been looking for from the start.

War and domination are a good example. Why is it that when facing threats from outsiders, we rarely look for underlying reasons or try to help them solve the problems that lead them to threaten us? Except for the Quakers, why is it that racheting up the threat level, even until we go to war, is virtually the first idea that we want to try? It seems so clear, for example, that the problems facing us in Afghanistan today arise from poverty. The one thing we do have is lots of money, technology and the ability to project power. Why can't we use that ability to create schools, power stations, water systems, sanitary systems, engineering, scientists, legal systems, financial systems etc. instead of bombs and drones? We would need to be culturally appropriate of course, since Afghani culture is quite different from ours, but a cleaner, healthier, longer, more predictable life has a powerful attraction to people of any culture. American culture has spread worldwide because of its promise. But instead, the madmen seem to hold sway. The first response is usually threats and dreams of domination, followed by death and destruction. Do bombs work on a proud people? In fact, the usual response

is resistance and determination. When Dresden was firebombed to the ground in World War II, the Germans picked themselves up and swore vengeance. This response is so universal that it can be relied on, yet those who believe in domination as a tool, refuse to recognize the reality. Instead, they expect attacked populations - *this time* – to collapse. Ultimately they need to widen and lengthen domination to the dimensions of physical destruction as we have done in Iraq. Why can't we learn to ask what really works for mutual benefit, instead of blindly attacking? The threat of war is invariably prominent among the first threats leveled and always near the surface when the self appointed patriots come out swinging. No matter that the politicians may feel a need to make speeches pretending that diplomacy should first be exhausted. And exhausted is the right word. A few perfunctory exchanges, with lies told to the home population, and then the patriots pick up their first idea again – domination – and go at it.

There can be a brighter side to this conundrum. The reliance on failing first ideas can open up opportunities for brighter, smarter, second ideas. In these newsletters we continually celebrate the smarter ideas brought in by Zero Waste analyses to replace the failed, tired ideas based on the recycling of discards. As you read the newspaper, you can find hundreds of news reports extolling new ways to *reuse waste and discards*. From agricultural excesses (which are not wasted at all since they are essential for the soil), to a new program to extract platinum from discarded catalytic converters, the impulse to apply the first, most obvious, most pedestrian ideas is praised by the media and the public. Only once in a great while can you read of any program to throw a wooden shoe into the very gears of the system of garbage and build in reuse from the start. In these newsletters I have reported on several inspiring innovations of this nature.

Today I choose to shine a light on an innovative analysis and success at figuring out why a first idea was failing, that led to the creation of a design that embodies a beautifully constructed second generation product.

Most of you probably are quite familiar with the presentations on the TED website – arguably the best site on the Web. One of them by Nathan Myhrvold discusses the reasons why vaccines are so difficult to deliver to where they are needed in the third world. About one-third of the vaccines sent to villages and small cities without infrastructure spoil before they arrive because they can't be kept cold. This causes some supposedly vaccinated people to become sick and they in turn can infect others. Children die because a vaccine becomes too warm. Myhrvold's team analysed the problem for its underlying causes and changed the defective thinking, which came about because of the failure of a first idea.

When the problem of keeping vaccines cold along footpaths first arose, the first idea was to apply the notion of ice chests (like picnic chests) for insulation. These are built around lighweight, highly insulating, cheap styrofoam. Why not apply the same idea to keeping vaccines cold? Make a box with thick styrofoam sides and put dry ice or freezer packs into it. This became the universal delivery method for vaccines in Africa.

Unfortunately, the best styrofoam boxes only kept vaccines cold for about four hours, quite long enough to finish your picnic lunch with a few beers in the cooler

but hardly long enough for a trip to a village to vaccinate a few hundred children. Myhrvold's analysis quickly showed that removing multiple vaccines from the chest by hand introduced a blast of warm air each time the chest was opened. Again, okay for a picnic lunch but a disaster for a delicate biological.

The answer**:** increase the insulating capacity by many fold and design a device that ejects the vaccines one at a time, like a vending machine, without ever opening the insulated device. Instead of the obvious ice chest model, the better models turn out to be a liquid nitrogen thermos bottle and a vending machine.

Myhrvold in his TED presentation reveals that the new cold chest remains cold for *six months* without requiring any power or new freezer packs. The laws of physics put no limit on how slowly heat can leak through a wall so we can suspect in advance that proper insulation can be exceedingly effective. Keep warm air out and the results are amazing.

Carrying vaccines in Africa (from TED)

Use properly insulated containers to transport vaccine.

…you may use the shipping containers the vaccines arrived in from the manufacturer. Alternatively, you may use … Styrofoam™ coolers

From a CDC how-to manual for storing vaccines.
…

On the Zero Waste Institute website, you will see first ideas rejected for second and third generation thinking over and over. For example, the universal method of setting fenceposts, using concrete is a first idea that is wasteful, unnecessary and not smart. ZWI has a patent pending on the next generation fence post stabilizer that uses no concrete and can be reused for a hundred years. Look for us on TED someday.

Do you know of anyone who should be reading this newsletter? Send me an email and I would be glad to add their name to the subscription list.

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