



Zero Waste Newsletter

February 2016

ANNOUNCEMENT! I just published my new book called *The Endgame of Politics*. This takes my work in resource conservation into new channels that have never even been proposed before. The elites who run this country force assumptions on us that are picked up by the public to become our accepted common sense even though they primarily benefit the elites, not us. Consider the trickle-down hypothesis that tells us that lowering taxes for rich people will make us all wealthy. Mostly I expose those assumptions that make life on this planet *non-sustainable*. Garbage creation is only one such among many. We simply can't keep on doing it the old ways and still survive. Best of all, our internet and phones and passwords mean that the worst cesspool of corruption in this whole country is no longer needed. We can easily get rid of it for the first time in human history. I refer of course to Congress and Washington politicians. With the Internet available now, we no longer need them.

I can't tell you how to win the long, bloody fight to get rid of corruption but if you do it, I can tell you how to avoid sliding back into the old, corrupt ways, just because you have no clear plan for after the revolution. This book is a plan, but more than that, it is a clear analysis of how to break up the unholy alliance of representation and power for the first time. The book is available from Amazon in a Zero Waste form – they don't print your copy until you order it. Use the search term ENDGAME PALMER. Get it while the ink lasts! Just \$12.



In these newsletters I often point out the specifics and benefits of redesigning products so that they can be perpetually reused.

Perhaps some readers think in terms of redesigning appliances or mechanical products that you hold in your hand with buttons or screens or openings with an electrical cord to plug in. Those certainly need to be redesigned but many products are more technical or have other special properties.

Some products are intended to be consumed in use. In other words, they are fundamentally changed in use, so that they are no longer like the product they recently were. Today I want to deal with one of those. The product I have in mind is a particular food. How can you even imagine a perpetual use for a food?

A recent article* discusses a marvelous ecological revelation. It's the kind of amazing research that biologists and geneticists accomplish by applied study.

Maize plants (what Americans call corn) have their insect predators. One is called an armyworm, which is actually a caterpillar. The maize plant has a way of poisoning insects that eat its leaves. Armyworms have a way to avoid being poisoned. Farmers root for the maize, not for the worm. To protect the maize from the worms, they tend to use generic poisonous sprays, called pesticides which poison many other things besides armyworms, including perhaps the animals or humans that eat the maize kernels. But biological study has now revealed exquisite and fascinating details of exactly how the maize plant tries to poison the Armyworm naturally.

The maize leaves have two kinds of cells, that do not interact on the plant. One produces a particular poison to which the plant has attached a sugar molecule. The sugar molecule prevents the poison from being active. The second kind of cell has an enzyme that can cleave the sugar molecule from the poison, activating the poison. The first time these two chemicals get to interact is when an Armyworm chews up the leaf and mixes the plant matter together in its gut. Suddenly the cleaving enzyme gets to work on the inactivated poison and begins to activate it.

That would normally be the end of the story. The insect would be poisoned and become sick or die. Most insects react that way, but the Armyworm has evolved a special way to de-activate the poison. Its gut includes a special purpose enzyme that does nothing but reattach the sugar molecule to the poison.

This response by the Armyworm would not really work the way I've described it. After all, the maize plant's enzyme is still present and it would activate the poison all over again and there would be a competition between the two enzymes. But the armyworm is clever. Its enzyme doesn't reattach the sugar the same way that it was previously attached. Instead, it turns the sugar around or inside out before reattaching it, known to chemists as a change in stereochemical configuration. Enzymes are notoriously sensitive to stereochemical configuration. In this case, the maize enzyme is no longer able to re-activate the poison with its altered configuration of the sugar.

At this stage of biological evolution the story seems to stop here. Armyworms are able to eat the maize leaves. But this leaves the farmer with a conundrum which he needs to solve. How to get rid of the armyworms? The chemical companies offer Asana XL, Permethrin, Carbaryl, Lorsban and Malathion and more for spraying against armyworms.

We have come back to the concept of product design. Does knowing the details of the interplay between plant and predator give us special tools to control the situation?

Here's a thought. What if the maize plant not only produced its natural enzyme but accompanied it with a new enzyme that could work on the inactivated poison with the stereochemically altered sugar attachment? That would defeat the caterpillar's defense and allow the poison to work.

Where could this new, enhanced enzyme come from? There are two common ways to change plant ecologies or genomics. The first, directed breeding, could grow many generations of maize and

armyworms and wait for nature to discover the new enzyme on its own. A little radiation or a mutagen could encourage mutations and maybe, in say a hundred years, maybe some useful mechanism would develop. Actually this interplay has been going on for a long time already. It's surely the way that the armyworm evolved into its present defense.

Another way would be for plant geneticists to design the new enzyme and figure out how to change the DNA of the maize plant to produce the enhanced enzyme in its leaves.

Watch out! Minefield ahead!

Now we are talking about a genetically modified organism. Are we talking about making Frankenfoods?

The answer is a guarded yes. If such a new GMO corn were developed, it would require all of the testing and suspicion that attaches to any other GMO corn. Could we just generate the enzyme in the leaves, that humans don't eat, or would it make changes in the parts that humans do eat? What about cattle that eat the leaves? At this point, that is all speculation. Perhaps the fact that the enzyme is finely tailored for a particular metabolite of a particular insect would make it innocuous for all other creatures. That is at least a suggestive argument.

However, it is not my purpose here to jump into GMO controversies. The point of this is to shine a light on one subtle feature of product redesign showing that redesign at its finest will require the services of technically sophisticated scientists and engineers who are intimately familiar with the design of the particular product. This is not a job for well intentioned laymen. That principle applies across the board to many product redesigns. This is partly why Zero Waste redesign leads to high-level jobs as opposed to the current exultation over low-level jobs spent collecting and destroying garbage. Whether you are talking chemicals, genetics, electronics or nano-technology, Zero Waste design will require the efforts of many universities, research institutes and design departments throughout society.

There still remains a question that we started with. If corn is consumed in use, how can there be a perpetual reuse? Corn is mostly eaten/used in processed varieties. High fructose corn syrup, ethanol, additives and chemicals are some of its products. Its stalks are fed to animals as silage. Should the concept of reuse be abandoned? My answer: a modified, yes, but not abandoned.

Growing food is not a single, isolated activity. It is part of the great agricultural cycle. As an industrial activity, agriculture has been bastardized into a short term way to convert fossil fuels into fertilizer and thence into bushels of food product. The capitalist form of the industrial model has no place for cycles. Instead, the model is to use up any resource that's available as quickly as possible for the quickest profit. How could it be done better?

Without going into details today, the big picture is clear. Every output needs to go back to the land. If that is human or animal waste, then back it goes. If that is distiller grains left over from alcohol production, that too. Slaughterhouse parts just the same. It may be composted or it may just be ground up but it goes back to the land. No more wastewater treatment solids going out to sea, no more dumps full of organic matter, no more burning biomass and pretending it's a form of energy. It all has to return to where it came from – the land. In this big picture, the input is solar energy but the land is perpetually reused in a closed cycle. When it really works, the land is not used up but is continually improved.

That is the big picture. The overall goal. How can it be accomplished? That can be a difficult question

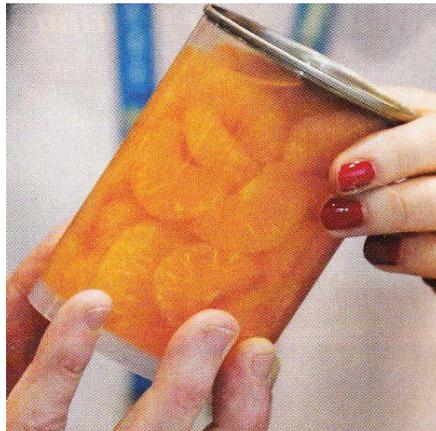
when input resources are cheap, or free for the taking, and waste discard is socially acceptable, even admired. If discard is made cheap by tax and financial subsidies and by social welcoming, who will spend the money it takes to return outputs to the land. Some of the problems are that the outputs must be clean, without organic or metallic contamination. They cannot overwhelm the lands they are applied to by their sheer volume. They may need to be dried. All of these problems, and more, must be solved to make land return work.

Lierre Keith has a wonderful book called The Vegetarian Myth. In it she indicts agriculture generally as an evil with disastrous consequences for the planet. She tackles the meaning of sustainable farming with refreshing honesty as *that which adds topsoil to the soil*, unlike today's conventional farming which uses up fossil fuel to extract quick products from the soil. This definition adds a serious layer to the Zero Waste interpretation of agriculture. It is not enough to simply return organic products to the soil but to ask how those amendments can be used to build topsoil so as to strengthen the nutrition in the soil. One obvious consequence to having a more humble and sustainable way of food production is to reduce the population to a level closer to the carrying capacity of our planet in concert with a Zero Waste philosophy. Seven billion and rising is not sustainable.

The benefits are the sustained future of food production and the life of our planet. What would it cost to lose those? The central questions are “who pays” and “who benefits” which lead to “who decides”. The answers to these questions tell you if the planet will continue to be devastated and why. It is best when the answer to all three questions is the same person. Under our economic system that is rarely true. The public loses, a corporation benefits and lots of the profits flow to the decider.

PLASTIC “ TIN CANS”

A recent article (2) reports that the plastics industry has figured out how to replace metal cans with clear, plastic ones made of polypropylene. Don't be surprised if you see new containers in your market



that let you see the soup or the chili or the tomatoes inside the can.

The can may look clear but there are multiple layers of different kinds of plastic in the shell and many additives inside the polymers. The picture seems to show a tin can-like cover. The one thing that is missing is bisphenol-A, the estrogenic additive that has been banned from other plastics that touch food. This one fact, all by itself, is enough for the marketers to start calling this new product “green”. The petroleum that is mined and refined and polymerized to create the polypropylene – that doesn't count. The design of the cans, to be used once, opened and discarded, that doesn't count. The energy,

labor and equipment in factories for producing cans to be soon discarded, that doesn't count. The environmental analysis is entirely trivial but that so often passes the test in this country while the planet continues its slide into 'green' despair.

3D PRINTING AND MAJOR APPLIANCES LIKE CARS

<http://truth-out.org/news/item/27430-the-urbee-3d-printed-car-coast-to-coast-on-10-gallons>

This is an article about a designer of vehicles who begins to get Zero Waste principles from his work. Here's a quote in the article:

"I was disturbed by all this defining of sustainability, so I just started to articulate what I thought it was. You just have to be really careful in what you build, and how much mess you make. And ... I absolutely started to think that long life plays such a huge role in this sustainability. The life of products has to start to increase dramatically. That's a little different than what I read in the literature. You mention long life and *it's like a leper walked into the room.*"

Without realizing it, he is stating the core message of the Zero Waste Institute. If we have to wait for every designer in every field to figure this out independently, the planet will be toast. Why can't they learn from stated principles of the Zero Waste Institute?

The meaning and usefulness of Responsibility

I often talk about the responsibility that we have due to our buying choices and the fact that garbage collection is exactly the opposite, a form of irresponsibility. Here is an anecdote from my time with Zero Waste Systems Inc. that illustrates the benefits of responsibility.

We were collecting an unwanted solvent mixture from Nitron Corporation that they called Developer/Rinse. We sold it everywhere as lacquer thinner. We pumped thousands of gallons of it out of a "waste" tank that they used. Sometimes we found water in the bottom of the tank. This was not good for our application but it was an especially bad sign for their delicate process making microchips. For them, water was a serious contaminant.

On a few occasions I mentioned the water to their engineers, especially wondering how it got into the tank and whether it could be excluded. To the engineers, remember, this was JUNK. This was thrown away, not something to worry about. They brushed off my concerns.

One day there was a whole lot of water in the tank. The next day, we got a notice from the company that they would be closing down for a whole week for a plumbing repair. It seems their little leak, that was a minor annoyance to us, had turned into a major problem for them. They lost millions of dollars in down time, because of a problem that they could have anticipated if only they had not had such a perverse attitude of irresponsible dismissal toward a part of their operation that they foolishly deemed unworthy of their attention.

Every doctor knows enough to have his patient pee in a cup to learn a great deal about the body's status from a waste product. But industry is still mired in a counter productive rejection of responsibility.

NEW PAGE ON THE WEBSITE – Your Personal Efforts – What should you do personally to help bring about Zero Waste. See http://zerowasteinstitute.org/?page_id=3170