TRASH MAGIC

VOLUME I: MANIFESTO

Figure 1: NO PROPERTY

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Trash Magic

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Contents

List of Figures

Chapter 1

Capitalism

What is best in life?

To care for one another, and to have adventures.

Technology can help us do both of these things, building societies where all physical needs are taken care of as well as which preserve the adventure that makes life worth living. However, as technology has advanced it has increasingly served its own needs. Because it has had such a powerful overall positive effect on the human condition(in some material ways), we have allowed the rules of technical progress to dictate the rules of the rest of our society. In this chapter I discuss how I view capitalism as an underlying force which drives this process, creating great suffering for humanity and the rest of the living world.

What is Capitalism?

What is capitalism? This is something that critics of it avoid a lot of the time to their detriment. If you look up various definitions, it generally goes something like this: "Capitalism is the economic system in which the means of production are privately owned." I hate this definition, and I think it's held back our collective effort to fight it for the last 150 years.

What this definition implies is that the opposite of capitalism is someone other than "the private owners" or "the capitalists" owning the "means of production", and "economics" being based on something other than private capital. I put all these things in scare quotes because I see them all as subtle weapons to inject hidden ideology into peoples minds by the very wording of the definition. First of all, the anarchist rejection of capitalism rejects ownership of minerals, land, and machines. So any definition that talks about "who owns what" should already be rejected by the anarchist, and we have already ceded a major point by allowing this definition to stand at all unexamined. Capitalism is a system in which some people, called "owners", claim to have power over certain things which they claim the right to carry out by force if needed. Capitalism is a system in which a military state exists which both feeds of the system of privately owned extraction and enforces the power structure that governs it.

The "means of production" is also a problematic phrase. While it is a bit ambiguous, I see this phrase as at least potentially implying that this the "means" is some sort of fixed infrastructure. The implication is that "the means of production" is a thing that exists outside of economic systems, which can be controlled by any of various types of government or state. This is false. The very structure of "production" in today's society is what I would call capitalism. The Soviet system, the various fascist systems, "democracies", dictatorships, monarchies, I would say every single one of them is capitalist. They all have this basic structure of military power creating a monopoly of force that protects a vast system to extract mineral wealth and destroy it as fast as possible by constant threat of violence. To me calls to "seize the means of production" sound like calls against a king to go seize the palace and tell the king what to do but to keep the palace and king in place. It's the same system, with slight changes. So to let the capitalists define these ideas gives them a victory before a debate even begins: it allows that the existing "means of production" should continue to exist without discussion. A true challenge to capitalism is one in which the very concept of production is reinvented. It means building industrial technology from the ground up around different values.

Another problem is with the notion of "economic system". I would argue that economics is again a part of the intellectual descendent of the basic idea of the One God

of monotheists. There is a Universal Heierarchy that exists, which allows numbers to be used to assign value to things. Human value becomes a number, always either less than or greater than or equal to any other numerical human value. Part of rejecting the basic ideas of capitalism is to reject this hierarchy cast down from God. But to even use the phrase "economic system" again lets capitalism be defined in a universe in which nothing other than capitalism exists.

Indeed in some of the definitions I've found online they even add phrases like "as opposed to State ownership of the means of production". In other words the supposed definition of capitalism used by most people is not a definition of capitalism at all, but a clever propaganda piece that creates a world in which the alternative to capitalism is another type of capitalism which is recast as the Socialist Enemy. Since I consider all the Soviet style "communist" countries to be capitalist in their philosophical worldview, I find it not surprising that they hold the same warped view of this false dichotomy. The communists can point to "capitalism" as their enemy, where "the ruling class" "own" the "means of production", rather than "the dictatorship of the proletariat". When this becomes a nightmare like it always does and destroys the environment even worse than "capitalism", people on the right say "I told you so" and people on the left say "it will be different next time! it's all Stalin's fault!".

So if we really want to move beyond capitalism, criticisms of it need to start trying to really see it for what it is, and see just how far the viral ideas about God that underly it have wormed their ways into the very language we use to describe it.

I will give capitalism the following definition:

Capitalism is a system of belief in which numbers are used to denote all value.

That, I believe, is the heart of the matter. And it points to why experiments like the USSR have ended up having problems so similar to those in the western capitalist world. In a word, money. Money is not just metal or paper or faith in a government, it is the idea that a number, specifically an integer number(money can usually be subdivided but only up to a point) can be used to denote all human values. This is why I believe the concept is so slippery, and so hard to break out of. You can replace dollars with time dollars, bit coin, gold, silver, bags of salt or gold-backed e-dinar and it's really all the same thing: numbers. Integer numbers. As long as there is an exchange rate between a system of value and an existing currency you have not really broken free of the current system.

And what is money? The purity of numbers has proven to be incredibly powerful. Users of the number based values have literally moved mountains with the power they have been able to deploy using money. In particular money based values have been excellent at

Figure 1.1: Worshipping the Number One

several things, some of which are good but most of which are bad. I will now explore the nature of money more specifically.

The Nature of Capitalist Money

Our currency is based on two things:

1. suffering
2. and minerals

Turning minerals and human misery into numbers is capitalism in a nutshell, and is the basis of our monetary system.

Capitalism is an industrial system in which all value is based on human misery and minerals. By creating misery, some people use threats of violence to control land. They use more minerals, fire, and misery to create minerals ordered with a precision based on their belief in violence and control through military order. The threat of inflicting misery using military technology(not only is our technology military, our concept of military is based on our technology as well, and both are based on the One God beliefs) is how some people known as capitalists claim "ownership". Ownership is a complex network of violent threats which allow threats of future misery and benefits paid from past misery to be added up numerically, building a ladder of power down which the physical

Figure 1.2: Suffering and Minerals

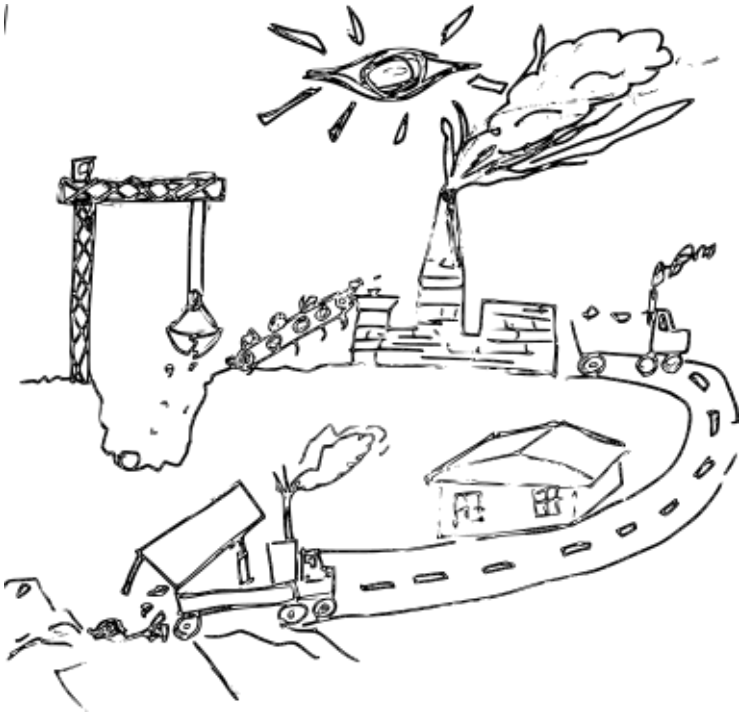


Figure 1.3: Dig it up, set it on fire, and bury it

benefits of mineral wealth slowly trickle, with the most landing at the top.

Any proposal to reform capitalism that maintains concept of numerical adding up of suffering and minerals is just capitalism with a new mask on. True reform means finding a set of moral values that informs technological figures of merit which are based on human joy, adventure, hilariousness, beauty, or other things that actually have positive value for everyone, and then re-builds our whole concept of what it means to have a technology up from scratch.

To repeat: to attempt to reform capitalism while continuing to use any of our current technology at all is a lost cause. The ideas of capitalism are built into the position of every atom in a modern technical artifact. If you want a world without capitalism you must re order every atom, completely re design how atoms go together from the bottom up. And in building this it makes sense to acknowledge that 300-400 years of industrial capitalism gave us the gift of minerals, which we can now live on forever.

Every atom. Every atom changes in how it relates to the whole. Same physics, same atoms, but new ordering principles, breaking out of the military design concepts. No more are the ideal shapes always planes, circles, and perfect grid arrays of objects. No more are tech artifacts locked into a centrally controlling clock that tells them when to work and what to do. No more is there a wall

between engineer and customer, where some things are known and some are secret: all information on construction is physically encoded in the artifact, and updated as more edits are made, even if the user does not document(data stream into the dataverse).

Capitalism as Religion

Capitalism is the hidden religion. It does not admit to being a religion and its believers(at this point almost all humans) do not realize they are in this religion but they are. Even members of various other religions decry people leaving their flocks for the "secular" world but won't directly name this as a competing religion. But a religion it is, complete with odd beliefs of all kinds.

In my observation, the beliefs of capitalism include:

1. Private property is sacred
2. All value can be added up using numbers
3. All value must be extracted from the Earth or from human misery
4. Human society is described by something called an "economy", which is a system for laundering mine products and human misery into numerical media of exchange
5. Hard work is an intrinsic good
6. Our world can all be described by a giant hierarchy, people, animals, objects, gods, ideas, all are always

> ranked and this ranking is ordained by the highest authority, whatever that is.

I believe that number worship is an underlying hidden religion that is integrated into all other modern mainstream capitalist religions. What is monotheism? It is the belief that there is only one true god. But this implies that you can count gods. That is the underlying assumption. It separates parts of the universe that are god from non-god in a rigid way, breaking up gods or potential gods into discrete numbers that one can count, rank, and ultimately then put one on top of all others. From this we get hierarchy of all kinds down through the ages and all the horrors of capitalism. But if you are a monotheist note that your One True God is almost certainly also a universal part of your world. So what makes you believe you can count gods? This other, hidden, religion that is required to phrase the questions and answers about your god using numbers. So do not take my attacks on the structure of industrial monotheism as an attack on your One God–I do not deny your god, merely your ability to count gods.

That being said, I do think this counting has led to other problems in industrial monotheism which must be combated, namely patriarchy. Monotheistic religions have a strong tendency to extend the counting hierarchy from their bearded man-god down to all Things, build-

ing an instant patriarchy into their world view. Don't do that!

Number worship, the belief in numbers as a superior picture of reality than other models. BBC documentary on history of numbers is actually blatant capitalist religious propaganda nonsense. Vietnam war, big data, the very word "rational", always the assumption that number-based ideas are superior than ideas not based on numbers.

Professionalism: A Capitalist Cancer

I am against professionalism in all forms. Professionalism divides us. We have split up philosophy, physics, chemistry, biology, design, manufacturing, theology, art, and technology, and very much to the detriment of them all.

I'm against engineering and design as professions. While specialization can be useful, I believe our society has created a soul-less techno-priest class which is evil enough in its very nature that technology needs to be re-built from the ground up outside that system. If your technology needs the techno priests to function, it means your technology is bad and needs to be replaced. If it needs extraction of raw materials from the earth or any control over large tracts of land in a centralized way to function it is bad technology and needs to be replaced. If it requires secrecy or proprietary control of information and use it

is bad technology. If it can't function without capitalism it is bad technology and needs to be replaced.

Specialization is fine up to about 100 people then it is a luxury for special projects. If you need someone who makes up less than 1% of the population to do something your technology needs a reset and it is bad. Our goal is total freedom for 100 people.

We need to start over from scratch and build a technology without the existing techno priests which can be built and maintained by anyone with the desire to do so, using waste streams of the old system. This has to happen in thousands of parallel tracks in many different fields of applied science and technology. I will focus on the parts relevant to my area of expertise: applied physics.

Capitalism Stifles Innovation

Part of what has led me to write this work is my frustration as a professional scientist with how capitalism has, in my view, held back scientific, technical and cultural innovation by decades if not centuries.

There are several aspects of capitalist ideology which have had devastating effects on science. The first is the obsession with novelty. This is probably the largest problem, which I would say has gotten progressively worse as science got more advanced over the last 100 years or so. The problem is that in order to be seen as a success in

science you need to prove that what you did is really new, and that newness takes priority in value over almost everything else. What this does is create a very broken ladder of importance of things to study. If you have the choice between two experiments which both show the same science, and one involves just seawater, dirt, and a mobile phone, and the other involves a 1 million dollar machine, a trendy new molecule, and some advanced math using a new computer algorithm, the latter is considered vastly superior. And this is based on the ideology of private property, even when legal intellectual property is not involved. Even in the public domain, when a researcher publishes a sufficiently new thing, that thing is attached to their name, and can be turned into real tangible monetary value.

All the elements I describe in the example above should be called out for causing problems with science progress. First of all, the use of expensive machines. This not only makes sure there is a barrier between the work of the lab scientists and the general public, it usually increases the distance between the researchers themselves and the subject matter. I believe that the purpose of all science is to create the closest possible link between the human mind and the world we live in. The more expensive your machine, the larger the barrier between mind and world. Expensive machines are great for building capitalist jobs(I've had these jobs!) But this is at cross purposes with what should be the goal of simpli-

fication. To eliminate a machine is to eliminate a high paying technical job, which hurts us as workers in science. Thus the incentive is opposite of what we want to do, which is always cut down the the size and number of machines needed to interact with our world.

Another element of the problems I've listed here is the "trendy material" problem. That is, science is strongly biased in favor of newly "discovered" materials over those we all know and have access to. This is created by capitalist ideology because we all need to try to own the property, both legally and intellectually, of "new" things in order to get the fame required to advance in our careers. If you prove that "your" substance has a different chemical structure than any that someone else has studied, and publish something not very impressive, you can get famous, and name the molecule. But if you do something impressive, but not really new, on something common like tap water or ground up moss or a soda can, you have to call it "educational demonstrations" and will not be taken seriously in high level research circles. But again, this is creating an incentive to do the opposite of what is good for science. Someone who interacts with tap water or pavement has a connection to much larger fraction of the world than someone who interacts with an obscure form of soot made in a special chamber that only exists in their lab. If our goal is to connect our minds to the world as well as possible, it's always better to follow the most common elements of that world, then things we

find around us. Capitalism pushes the researcher away from those things both because of the need for novelty and also because the more obscure a molecule is the more likely it is that a capitalist can make a profit on it. A product based on a simple recipe with tap water and gravel is worth infinitely less money than one based on a complex and expensive process.

The ephemeral concepts of "ownership of ideas" above pale in evil compared to legal intellectual property. This could be a whole polemic work of book length on its own but suffice it to say that the corrosive effect excessive patent and copyright are now so severe that anyone who's worked at all in science in the last 10 years is already pretty upset about this issue. Even those who claim to support the system agree that it's now so far beyond even the twisted intent that originally existed that they are against it in its current form. However, for the record, my position in this work is that it is pure evil to claim the concept of ownership over science or technology. The scale of the evil is partly escalating as the technology becomes more personal. As our technology becomes more a part of not just our lives but our selves, we find corporations claiming to legally own parts of our lives and even our bodies with their patenting of genes both in humans and in our various bacterial neighbors we carry on our bodies. Eventually, the property ideologues will, if left unchecked, build a world where humans are all owned by a consortium of corporations, where we are all literally

the property of corporations and machines. Science fiction warns of the possibility that a "rise of the machines" will cause us all to become slaves to artificially intelligent machines, but I would argue that AI is not needed for us to become slaves to machines: humanity is in the process of enslaving ourselves to non-intelligent machines.

I touched on the problem of professionalism already but I need to elaborate on this in the context of science specifically. We have always claimed in philosophy and science that unification is a goal. Unification of electricity and magnetism into one theory and then the weak force in with that are all seen as great triumphs of physics. Bringing all the atomic elements together into a single unified periodic table is rightly seen as a great triumph of chemistry, etc. But in modern applied science we find huge incentives in the opposite direction of unification. Because we are all forced to carry out science in the professional system, and there are never enough professional positions to go around, those with the good professional jobs must all jealously guard our positions. This means a biologist who can do good physics or a physicist who can do good biology are both potential threats to each others' jobs. Whereas the biologist who creates an even more obscure form of biophysics that gets its own whole new department is the most powerful of all: the unique specialist who owns their field entirely. The highest salaries and most honored and secure positions will go to those who do the opposite of unification. And sure enough, the last

few decades have seen a proliferation of tiny sub-fields with their own jargon no one else can read in all fields of science. This has coincided with the rise of extreme market ideology since the 1970s which drives universities to behave more like businesses and research departments to behave more like marketing departments. The corrosive force of capitalism has inflicted a sort of Babel curse on all science, making it impossible to talk to each other anymore.

This concept of unification applies in particular to building the tools we use for science. The most useful tools are the most universal: razor blades, tweezers, optical microscopes, or pliers. And yet no professional scientist can make a living selling any of those, so we're not incentivized to make more tools like those. We can make them for our own use in our labs, but capitalism directs those types of tools to be made by the cheapest possible labor, so building them is avoided by the professional classes. Conversely, the tool which only does one thing extremely well can be a perfect monopoly on that thing, creating a large markup and building a comfortable place for the professional. Again this is a case of capitalist ideology constantly pushing us all to build the opposite tool from what would benefit our fellow scientists or the rest of humanity.

These claims are just claims when stated in a a manifesto like this. I state them without extensive proof because the proof that abandoning capitalism can push sci-

ence and technology forward much faster has to be by example. We must actually go out and do this, build science and technology up from scratch on non capitalist principles, without professionalism and without property. Ultimately this ends up looking more like an artistic movement(for which a manifesto would be a normal part of the creation process) than a part of science. Trash Magic will take many forms in the future, but its initial form will indeed be that of an artistic movement, because that's the simplest way to build things while casting off the old figures of merit used by engineers and the rest of the technocratic priesthood.

Death to Capitalist Math!

Math is not objective reality. This is obvious to most people who don't do math, as well as to most working mathematicians, but it's an amazingly popular belief among technocrats. Math, like any other model built in the human mind, is a sort of reflection of the world. A very powerful one, yes, but still just a part of our minds, and like any other model, there are choices we made to get where we are with math which could have been made differently.

The example I'll give here is a paradox that I find particularly interesting in terms of what it tells us about hidden ideologies. Mathematicians call it the Banach Tarski paradox, and it generally arises in parts of the

math curriculum concerned with point set theory. Never mind exactly what that is, it's something usually taught in the late undergrad or early grad level in pure math(as opposed to applied math which is not concerned with these issues).

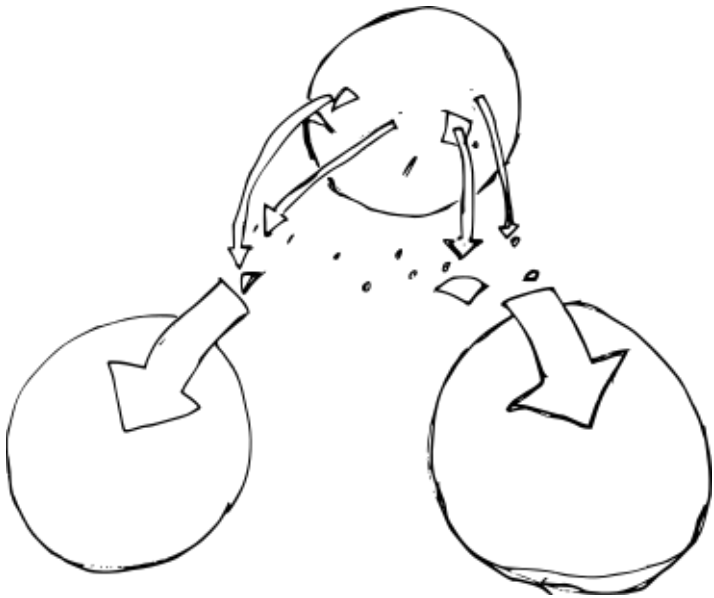


Figure 1.4: Construction of Banach Tarski paradox

What this so-called paradox does is create a way to construct two spheres of points from the points in one. That is, all the points in the first sphere are re-arranged

in such a way that those same points make two spheres of the same volume as the first.

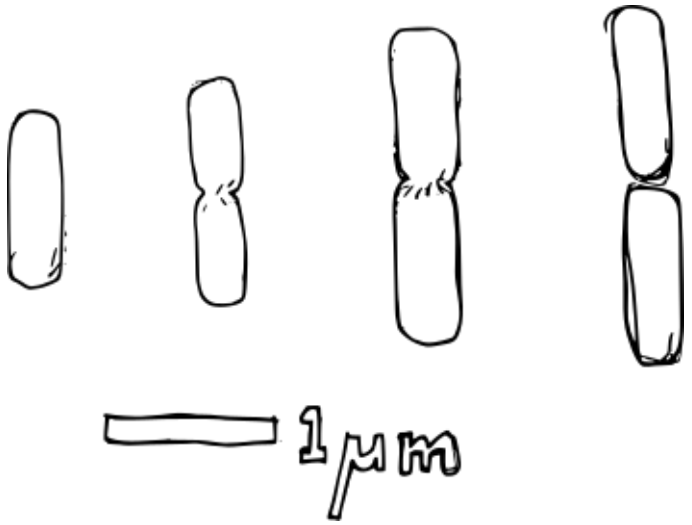


Figure 1.5: Biological Cells Ignoring Math and Capitalism

Why Now?

Now is the time for *drastic* change unique in our history.

Why now in particular?

Both the positive and negative sides: danger to humanity is imminent, but also opportunity is greater than ever before because of the vast mineral wealth that is

everywhere and a critical mass of processing and communication technology. Marx was about 100 years early, and didn't have access to the information or materials we do today. Globalization and Capitalism really have literally sewn the seeds of their own destruction, by creating seeds for millions of new societies by spreading mineral wealth everywhere around the globe.

The very destruction of capitalism focuses us on the better future in several ways. For one thing, the sections of society most exploited or crushed by capitalism are often also those closest to the massive waste and destruction streams of the present system. Often the poor and dispossessed live near dangerous waste which also contains what could be priceless mineral wealth if we had the technology to bring it back. Wherever you find the most oppressed people you will also usually find the most ruined land with the most material waste. Just like the people our economy casts aside, these materials often exist outside the ownership system, they are claimed by no one and valued negative or not at all by our economic system. But this creates a potential opportunity to build very rich new forms of industry that exist without ownership or money: built by people who no one pays, made from materials considered "toxic waste" by the ownership society, and given freely to a community who also owns nothing undermines the entire structure of the existing system.

This connection between the people and the materials

cast aside is what Trash Magic is really about. People who's time capitalism does not value can use the materials it does not value to truly work magic: to build great works of art that we can live off of using the powers of our minds.

Purpose of this Book

This book is a manifesto. That is, "...a public declaration of the purpose, principles, or plan of action of a group or individual.", as it's described on manifestos.net.

Note that novelty is not my goal. I believe that the obsession with novelty in applied science is a toxin of capitalism and that by ignoring where ideas come from and using them as needed, with no expectation of novelty that much faster and better progress can be made. This work comes from the heart and mind of one person but none of that comes from just me: I assume everything I say here has been said elsewhere and that I've been exposed already to most of what I present here, in various forms, in books I've read or from people I've talked to.

Paths Out of Capitalism

I'm against the machine. That's what this is all about. I hate industrialized society, and I resent that the good products of it are used to hold us all hostage to the totality of The Machine. The military machine, the capitalist

machine, the consumerist machine, the extraction of raw materials machine, the political machine, all of it. We're told that if we it's all or nothing. Don't like nuclear bombs? No vaccines for you. Sick of the Internet giants controlling your life? Well, I hope you like writing letters by hand, asshole, you must be a Luddite. That's the message over and over from the mainstream of society.

I challenge all that. I say that the course of the last 300 years of industrial development has not been just fixed by some immutable laws of nature but has in fact been the product of decisions made which could very well have been made differently while still learning how the world works and how to make useful technology to better navigate that world.

Chapter 2

Free Technology

What Does it Mean for Technology to be Free?

Free means that a thing can be created with only labor and the waste products of the old world or renewable products of the natural world, using information that is available to the public both physically and logistically.

I will start with a list of what makes technology non-free. Since this is a manifesto, it makes sense to call out what the problems are that I aim to work on with this project.

What does it mean for hardware to be non-free?

- If someone claims the legal right to control who can make a thing it is not free.

- If materials mined or otherwise extracted from the Earth are needed to make a thing it is not free
- If professional expertise that cannot be learned in a short time from clear online instructions are required to make a thing it is not free
- If a tool from the consumer capitalist economy is required to make a thing(e.g. a 3d printer from a factory) it is not free
- If the fabrication of a thing requires the use of energy from the Grid or non renewable sources, it is not free
- If a thing cannot be re integrated into the industrial ecosystem in a modular way after its lifetime it is not free

What about free technology, what is that?

- A free thing can be made from readily available waste *streams* of the existing industrial capitalist system
- A free thing is not patented and is disclosed publicly in sufficient detail to make patenting it illegal
- A free thing has publicly shared non copyrighted instructions which enable a non expert to learn what

they need to learn to complete the construction of the thing

- A free thing can be fabricated in a scalable way, from single units up through millions of units, with automation at large volume using robots built from same technology
- A free thing uses only ambient energy to function and to be produced
- A free thing has a post life trajectory built into the design, where all components are easily salvaged into other Free Things
- The construction of a free thing must create value from "nothing", which can then create value outside the world of numerical currency
- An individual thing by itself is free if it is also part of a larger group of technologies, which I call a "complete technological set", which can be used to reproduce themselves and to provide all basic human needs
- Free technology does not distinguish between technology and art: it is always both.
- Free technology naturally reproduces with the help of people and/or other animals. If left out somewhere, people will naturally choose to use the thing

> and information contained in it to make more and to continue the development of that technological path.

What is the connection between free technology and "open source hardware"? Open source hardware does not at all have to be free: it can require a vastly expensive factory to actually produce, as long as the design is publicly available. This maintains the power relationships of industrial capitalism: the means of production remain safely in the hands of the capitalists, we are just re-arranging how we share amongst ourselves. The difference between free and open can be more subtle for software where it's always free in the sense that it can be copied an infinite number of times for no cost in principle. Hardware on the other hand is not just information. Without supply chains that are wrested from the control of the masters of the system, what is or is not free is affected very little by "open source" hardware.

Another important shortcoming in the open source model is the lack of demand for the project to be accessible to those outside the technical guild that built it. This is not as bad as it used to be, but it's still common practice for "open" to mean a thing has horrible documentation and usability as contrasted to "closed" commercial software. What this really does is *further* enforce the class divisions in capitalist society by making a hierarchy of who gets free stuff and who doesn't.

Those who are in the software tech guild can get free things that are unusable to a normal person, and which have such opaque help that no one outside the guild can be reasonably expected to figure it out.

Avoiding this shortcoming of open source software in the free hardware project will be a challenge in some cases. This means that if you want to use something involving the physics of magnets to build a thing, the quality of applied physics education you make available to your user determines the freeness or non freeness of your technology. That means that any free electromechanical technology is not really deployed until a whole curriculum is made freely available on classical mechanics and electrodynamics. That curriculum must be held to much higher standards than are presently applied for college or high school physics education. It must be very applied, with direct numerical examples throughout which can be easily run by a novice on any computer or phone. Also it must be able to cater to a very diverse range of learning styles: hands on, mathematical, theoretical, visual, etc etc. *All* of these must be made freely available in multiple open free formats. It must be possible to do this with printed pages and no computer or with any type of computer or personal device and no printer(either). When the thing is built, it must have information printed on it or embedded in some obvious way, which links back to the main free storehouse of documentation. That documentation must also be decentralized to prevent any

authority from destroying the information.

This imperative really affects the way that progress moves along. A working wire coil is not enough. It must be well characterized and documented with a series of easily accessible physics experiments. There must be both video and written content showing how to put it together. These experiments lead to a very fractal level of digression, but in the end they lead to absurdly robust technology which can be recreated from scratch by anyone anywhere quickly.

What is free energy? Usually this term is used by various conspiracy nuts to describe ways of "getting energy for free" from something like the zero point quantum energy or the Earth's magnetic field. Both of these are nonsense, as are all the free energy schemes presented throughout youtube and the rest of the Internet.

No, we are told, energy is not "free". It has to COME from somewhere. But this notion is based on a capitalist world view. Energy is deemed "free" if you don't have to get it from a mine and labor. Most modern renewable energy is not free: much labor is expended to build the infrastructure out of mined minerals which have a finite lifetime and eventually go to landfill to be replaced by more mining and labor.

But if free energy is energy that can be useful but is not derived from mining and labor, then free energy can and does exist. Energy not spent on air conditioning when you build under a shade tree is free energy. Energy

from the sun that warms through your front window is free energy. And the electrical energy stored in salvaged rebuildable capacitors from salvaged rebuildable robots storing ambient energy is free.

Capitalist logic always looks for ways to show that things are not really free, because capitalism is based on the ideas that value comes from labor and mined minerals. If we approach industrial development from an anarchist perspective, however, we seek to build technology which is truly free, where no mineral extraction is implied in its construction.

A technology is free when it gives more than it takes. For instance a robot might require a few hours of service from human labor once a year. But if it does the equivalent of even just a few hundred hours of human labor it has a net negative cost in labor-value. In terms of minerals if it is built from minerals that were polluting the world around us, the mineral cost is negative: as opposed to subtracting value from the land as mining does it adds value to the land. And finally the energy of the technology must be free in the sense that it absorbs from something unwanted elsewhere.

Ultimately what is being built here is a form of artificial life. Life takes only what can be given from somewhere else. Our technology exists in a world where humanity is God. This all goes back to the notion that the structure of our technology is based on the monotheism of its initial architects. We have built a technological

world where Man is God and only God is above Man(to use biblical sounding gibberish).

But this technology will be alive, will exist as animals and plants do, without a singular separate God. This means that while it needs humanity to help it survive at all stages and can easily be controlled by humanity it will exist on its own and can function to a large extent on its own, following it's hardware-progammed logic to find what it needs in the environment to keep living and carrying out its mission.

Free technology is owned by no one. Not only is there no intellectual property, there is no physical property, except for the Trash Wizard stick, which might effectively be a part of a Trash Wizards person. The act of creation of an anarchist artifact is a gift to society of that artifact. A trash wizard might grab any technology lying around and re purpose it at any time. Anarchist technology does not recognize the concept of assigning value to things numerically in any way. Anarchist technology may get involved in various value circles, having various types of abstract relationships with various value circles, as codified in the Data Feed. Anarchist technology is also energy free in the sense that it always uses ambient energy, be it a set of pedals, a hand crank, a wind turbine, a steam turbine, a tidal generator, a lightning accumulator, or a solar concentrator. Anarchist technology is designed to be as modular as possible, being as friendly with other unrelated technology as possible. Anarchist technology

does not distinguish between information, energy, and materials–all three are processed as equal participants in the various flow through the system. Technology is not to be considered free unless it can be constructed by a small band of trash wizards using their trash wizard sticks using common source materials from the waste stream of the old extractionist economy. The ideology of trash wizardry is that capitalist industry sacrificed itself for the bounty of our new free world. Mining is dangerous and destructive and suicidal, but it's done, and we thank our ancestors, thank their sacrifice and their hard work and the creation of so much material wealth so evenly distributed(you can find a mineral from anywhere pretty much everywhere thanks to the spread of capitalist industrial technology). We give thanks for this great gift from our ancestors and build a society based on free living on the bones of the old world. We accept that things will never go back to how they were before industrial capitalism but that we can live better because of our mineral inheritance. We accept that the ways of the old world were a suicide pact, but also that even in a more free world, we can never be free from change and uncertainty. Ways of life, empires, whole worlds, climates, continents, will rise and fall, and we cannot stop that level of cataclysmic change from happening. But we can build an adaptable and sustainable future based on free values that moves forward into a future actually worth seeing. We can bring adventure back into the human

condition, as well as acceptance of a huge and uncertain world, and our role as passengers on it.

Anarchist technology also breaks barriers between customer, worker, engineer. We eliminate these hierarchical notions. We are people. We build things as needed and help each other as needed. We tell stories to express our values with the help of our Data Feed. We break the very idea of an economy open and build a new way of relating to each other and existing.

Destroying the Economy

That is the goal. It is as it always has been an evil system to force all of humanity to help evil people to do evil things. End trade. End money. And end all private property, now and forever.

Fundamentally, as every capitalist will explain, the economy is about making it easier for people to trade different kinds of things. And it is of course assumed that you need things from someone you don't know who wants to trade money for stuff you "need"(even if that need is artificial, based on those people controlling all the communications technology on the planet).

So the way to destroy that is with technological Complete Sets. A technological Complete Set is a set of technological methods and tools which allows the users to live without an economy. That means they already have everything they need with that core technology plus some

work that is not too arduous for them to do(less arduous than engaging in the outside economy).

A complete technological set has the following needs met:

- food
- clean water
- disposal of human waste
- temperature control inside sheltered areas: heat and cooling of air in indoor environment of some kind, construction of those shelters such that this needs minimal

- energy(use natural heat and coolness from the environment)
- communication/networking/controls/automation/audio/video these are the real reasons we need "computers"
- medicine and drugs
- make any of the tools needed for the rest of this, and do what industry might be needed to adapt to changing conditions: more people, fewer people, new

That's enough. The rest comes from that. And this is very hard and encompasses a lot of things.

Food is the one people always gravitate towards first, but I think that's a mistake. Growing your own food does not give independence, especially if that food is tied

to land that is part of the ownership system. To be truly free you have to be able to get food fast anywhere with gathering, hunting, and *rapid* and *dense* agriculture. My guess is that a new agricultural technology will be needed that integrates the rest of the complete set with food *and* drug production, since it will all be part of the fractal reactor system, moving nutrients around as needed to grow both food and also other things that can be grown like drugs and even carbon nano structures. So when I put food on here, I'm not thinking of farms I'm thinking of a huge range of options. For societies that have chosen to live in water, I'm imagining 24/7 aquaculture driven by high intensity grow lights made from organic LEDs which are driven by tidal energy, combined with reactors that get needed nutrients from the sea while removing undated salt. For deep sea dwellers, the main energy source will be violent wave action and wind, which can power floating worlds of aquaculture in the same way.

I propose that the problems that need to be solved for food independence will be solved as a side effect if we focus on medicine first. This is one of the ways the capitalists use of controlling us. And they know it. "Sure", the capitalists say, "go live in your hippie tree commune. But when you need an MRI and some antibiotics or AIDS drugs, you'll have to come to us and if you don't have federal reserve debt currency to pay for it we'll let you die."

As applied physicists it is our job to build the tools

that let people practice medicine. That means chemical testing and processing, growing of all types of microbe and plant needed for medicine in house with short lead times, non-invasive imaging, surgery, prosthetics, and a lot of other measurement tools, as well as the ability to quickly and accurately access the sum total of human medical knowledge. The last part will require a complete reorganization of how medical knowledge works, and elimination of the arbitrary lines between doctor, nurse, pharmacist, patient, technician, and all the rest. That is a hard problem, but it has to be solved to destroy capitalism, because we need medicine to live good lives and the capitalists have one of the most vile monopolies on that.

So we need a chemical reactor that can work with microbes as well as chemicals, but this also covers a lot of other useful things! It's how we get clean water and turn human waste into useful products, including food, covering several of the points above. It's also how a lot of manufacturing will happen, because a closed environment of tubes and chambers and pumps is such a good place for assembler robots to function.

And what about cooling? We need refrigeration for a lot of things, including food and medical storage, as well as cooling to make spaces not too hot to live in. That means pumps, and fluids. If you can pump and move fluids around you can cool, with any of various working fluids, including water and some readily available other

chemicals like ammonia. Making ammonia from urine and then using compressors to make coolers out of that seems like a good choice for a universal basic cooling unit.

Heat should really be the clever use of solar(as in heat, not some photo voltaics, which I oppose in their current form) as much as possible. And cooling of human habitat should be the clever use of cool deep water and cool deep earth as much as possible. The heat is there and the coolness is there, we just need to think the heat flows through a bit more. And with private property fetishism eliminated, and the States finally smashed, migration can be a huge part of this. It is a simple fact of life that some places are much nicer one time of year than another. One of the great crimes of the nation-state is forcing humanity to pretend this isn't true. Migration to a different climate on the time scale of a season is not hard technologically, it's all politics that stops it. No borders! No nations! No property!

So now the list above needs to get re-arranged into a list of things to actually build. Pumps, motors, generators, energy storage electrolytic cells, energy storage in pumped water, construction of all sizes of tubes, all this forms the matrix the rest is built in. And I need the generic assembler/editor technology mentioned before, where manipulators can cut and weld from the nanoscale up through the meter scale the found objects thrown away by capitalist society.

That should form the seed. If it's easy to do a chem-

istry process, build a good environment for a biological process, and reverse engineer and edit arbitrary semiconductor circuits, people with expertise on these things will be able to quickly replicate the capitalist technology they use now. Most "professionals" are being hurt by capitalism now, and using bad tools that make it hard to do their jobs. Given the alternative of free and also better technology they'll move over in droves and drive this thing really fast, we just need to light the spark, make that first set of tools, and lay down the design rules that make this progress work well while continuing to avoid capitalism. Part of how this needs to work is we need tools that people can adopt *quickly*. A trained doctor should be able to use our medical tools immediately because their function is obvious, simple, and easy to modify as needed by a person competent in their trade but with zero background in our specific technology. We seek to remove the technician and engineer completely from the process of technology usage.

How does this all add up to destroying the economy? The best people will jump ship the instant they see that we have a better offer than the capitalists. The capitalists rely on the exploitation of the professional class(with lots of perks thrown in to differentiate them from the working poor) for their system to work. Given a choice, if people switch instantly to our methods, their system of fear will crumble. They will keep paying people to do work, but the wages will have to spiral upwards as the best people

refuse to work for money. Eventually the working class can actually bankrupt the capitalists by removing their labor from the money system. If the last capitalist wants to pay the last professional a trillion dollars a year to sell themselves stuff, so be it. Without the labor of the masses, they're just another LARP club, and harmless. And that's how you kill the "economy".

Chapter 3

Principles

Statement of Principles

- All technology should be free
- All people should be free to leave a technical sphere and enter or build another one
- All national borders are not legitimate and must be abolished
- The world is magical. The properties we have always called "magic" can be ascribed to all things in the physical world, and these powers can be harnessed by the techniques of Trash Magic
- Capitalism cannot and should not be reformed, it should be opposed in all places and times until it dies
- The concept of professionalism is harmful to the

human condition, it poisons the soul, and is evil

- The concept of finite number to represent human values is a mind virus must be purged. The infinite exposes deeper truths than finite. These problems go to the deepest level of our mathematical thought from arithmetic to the underlying axioms of mathematics
- Morality consists of a set of axioms. An axiom is a unproven statement which we take to be true in order to build up a system of thought which can guide action. The principles in this list are put forth as axioms.
- It is not our role to debate capitalism with its defenders. Every possible basic argument for or against capitalism already exists on the Internet. Our job is to build a set of moral axioms, a set of technical skills and knowledge and build up a practical society from that. It is not our job to waste time repeating the same arguments with capitalist apologists and time wasters.
- No technology should be made from mass-mined materials
- The sum total of all money that exists in the world is a small fraction of what would be needed to compensate the victims of capitalism from its crimes(e.g. slavery and imperialism), thus there can be no justice within that system

- Every single word said every single idea ever put forth by an economist is a vicious lie. Economics is not a science, and this work is rejecting traditional science anyway. It is not our job to argue with the economist it is our job to build a better world in which they are not welcome.
- The wage system must be abolished
- End work. I am against work in all forms. We must attack the concept of work at all levels.
- Technology is personal, as it should be. Relationships between technology and the human body are always in mind.

Design Rules

Engineers who build technology usually use something called "design rules" and "figures of merit" as guides for how to build a thing. The following are the different design rules in which we may deviate from capitalism to end up with technically different results:

1. The more general solution is always better
2. The Most readily available materials are always the first choice to use as well as to study
3. The most obvious solution is the best, although what is obvious may not be obvious
4. Self similarity is a desirable property, and by default it will be built in for several(but not infinite!)

zoom factors to all technical systems

5. All technology is art, all art is technology
6. All technology contains its own data, is linked to itself on the web, self documents how to make more, where it came from, where it is going
7. Technology is not really deployed until you can create it with zero federal reserve debt or consumption of mined or extracted material. To deploy a technology is simply to make it and have it get used, and you must spend zero money to make that happen. Selling it after that is optional, and can be done for workers to get central bank debt currency but can also not be, and all parts can float in and out of different value circles(more on this later in this work)
8. Absolute precision will scale linearly with scale, meaning that we might keep just 10% relative precision at different scales, with gross motion at 1 meter with a few cm uncertainty, then a few cm motion with a few mm precision, on down to 1 nm motion with 1 angstrom precision.

9. Every piece of technology should be as versatile as possible, with clear and easy instructions encoded in it for many uses
10. We will not build or work with those who build antipersonnel weapons. Drones and other machines are fair game as targets, however

11. Every technological component should have the maximum possible number of uses, and should be cross referenced with other instances of itself so that the user can find out those other uses instantly, and this should be true of all the sub-components of a technical artifact
12. Every technological artifact and component should tell a personal story, connected to users, builders, and artists.

Chapter 4

What is Trash Magic?

Why Trash?

Who owns a dog turd left on the street? Who owns the piles of plastic bottles that collect in an eddy of an urban stream? Who owns the soot that collects on the walls of a bus stop? No one. The concept of private property, which I regard as evil, does not incorporate all things. For capitalism to function it has to have both "assets" and "liabilities", which the capitalists associate with opposite signs of numbers. What if a turd is not a liability or an asset? It does not exist in the capitalist universe, it is their ultimate trash, of value to no one, and it is the seed that we must use to create a better world.

Why Magic?

Many reasons. First of all, what exactly is magic? It's subjective. Magic is what, subjectively, gives us a certain feeling of wonder about the world. I believe that that wonder should be intrinsic to our technology always, just as we expect it to be with art. Hence the removal of the artificial separation between art and technology is a path to what is essentially a form of magic.

Also, the use of this word is very annoying to members of the technocratic priesthood which this work seeks to undermine. The very possibility that someone might do something useful and interesting in a sphere called magical is upsetting to them, because it is clearly not part of their "pure", "rational" world. This thus draws a line in the sand of sorts: on one side is engineering and business and the rest of the "rational world", and our work stands very much on the other side, where things are a little less sharp and clear and countable. Hence my statements in the first chapter about Trash Magic being an artistic movement in this first stage.

What is a Trash Witch? What is a Trash Wizard?

Witches and Wizards have for centuries been symbols of humans' ability to wield various magic powers. I draw on many traditions for this concept, from pagan lore through

Tolkien and Harry Potter. The traditions built up from fiction, culture, and religions of various kinds give us a picture to draw on for the archetype of the Trash Magician. I don't want to use the term "magician" too much though because it can be mistaken for the person who puts on a magic show. Perhaps that is not all bad, though! The magic show can both teach and inspire wonder and that is certainly one goal of Trash Magic.

A potential downside of calling us all witches and wizards is that those can be gendered terms, and that's not what I'm looking for with this new society. But I will propose for the sake of this work a non gendered definition of witch and wizard. The person wielding trash magic at any time is practicing witchery or wizardry if they are doing witch like magic or wizard like magic.

What?

Well, for example, let's say you're in the woods at night, doing some hard core potion making and saying something like "fair is foul and foul is fair", and there's a lot of cackling. That's witchery. If you're in a huge field of rocks swinging your Trash Staff around and launching lighting bolts at the other rocks, that's wizardry. It doesn't matter what gender the practitioner may or may not have–if you are wizarding you're a wizard, if you're witching you're a witch. At least for the moment. Mostly trash magicians have both Trash Wizard and Trash Witch natures, and most magics we practice will use both as well.

But I have still only loosely defined this way of being. The Trash witch is someone who believes in a world where we both have a element of adventure and mystery in our lives and where we have the advantages of what we now call "modern technology". We believe that this magic should be available freely to everyone in the world, and that everyone in the world should have the freedom to wield this and modify it as they see fit, and use or not use whatever magic they need or don't need.

Trash Wizards and Trash Witches use the laws of physics and the methods of applied physics as a form of magic. We teach that magic to others, and spread both the serious scholarship of Trash Magic and the basic practical skills needed to give the magic to all.

All our teaching and building is free. Free, meaning outside the money system and capitalist economy. But also free meaning people have total freedom to take this and duplicate it and modify it and make it truly their own. A love of pure science demos is a core value of the Trash Wizard or Witch.

Another goal is independence. A group of just Trash Witches should for example be able to live on their own, with a good quality of life. Maybe dozens of Wizards or dozens of Witches can easily form tribes to build and scavenge and do adventures and art. But also tribes can form super-tribes which merge to build truly large works. The only way giant social structures can be optional and not control us all is for us to be able to live freely with

just a few people. The magic we plan to wield here is designed to give people that power.

Figure 4.1: Wizard by the creek

We also strive to amuse. You don't want to learn

about magnetic fields just for the hell of it or just because they're useful. You can see from us that they're actually magical! Magical enough that a show put on with magnetic fields or electric fields is very much worth watching. In fact, one of the most popular shows in most science museums is the electric field demonstrations with giant lighting machines.

So a Trash Magician uses a combination of Wizardry and Witchery to amuse and provide for people with Trash of the world. Trash is generally stuff that is not only free but infinitely free. Not only can you go find one or two or 10,000 of a thing, you know that later you can go back and do that again as many times as you want. This is true with flowing water from spring snow runoff or from tides or drainage of some large rainy area. It's true of winds that always blow, of the sun, of sand and dirt and rocks. It's true of sticks shed by the lower sections of pine trees. And it's true of the plastic bottles thrown away by capitalist society.

A society of free stuff is not one with "zero cost". It's one where cost is infinite but value is also infinite. We are moving to a value system that works mostly with infinities. That is part of what makes Trash Magic actually magical. And if you're a Trash Witch or Wizard, that's your stuff! You wield the magic that moves the trash around!

In addition to Trash Wizardry and Witchery one might be a Trash Daemon or Trash Imp. Trash Goblins can

have a place in our community but not Trolls.

Trash Wizards are always there for everyone. We welcome the refugees of capitalism and it's evil twin, war. We do not recognize the validity of borders and are here to help subvert them as needed to help the down trodden.

Alchemy, Chemistry and Art

Part of the narrative we learn when we study chemistry in school is that of the failure of alchemy to accurately describe the elements. We learn that these primitive prechemists thought of the elements as being earth, air, fire and water, rather than the array of chemical elements we know in today's periodic table. The *real* elements are divided up based on our supposedly superior modern understanding that atoms are the basis of all matter.

I dispute none of basic science we all learned in school in terms of atomic structure, this manifesto is not quite that kooky. What I do dispute is how information is organized in our minds and in our equation system. Consider an element like oxygen. We know that a lot of oxygen in the world around us is in the form of two atoms together, as a gas which makes up about one fifth of the air around us. We also know that all water has one oxygen atom(along with two hydrogens), and so all the water in our world has oxygen. Fire is pretty much always a rapid chemical reaction involving oxygen, so we also know that all the flames we see in our world on Earth are partly

made from a form of oxygen. Finally, the one of the most common minerals on our planet is the relatively inert silicon dioxide that makes up most sand as well as many other minerals. The melting point of this solid is well over one thousand degrees.

Now, while I would never deny that it's useful to say all these things have oxygen, or to understand what that means, is that really the most pertinent quality they all have? To the alchemist sand is "earth", fire is fire, water is water, and air is air. Four elements, which we deal with very differently in all possible ways. We look at that and say it's "wrong" because the knowledge of what atoms make up these things is somehow more "fundamental" supposedly. But what if we didn't organize things that way, even though we understand how atoms work? What if we still recognized that earth, air, water, and fire as elements, which just happen to be also made up of atoms? This world view would have the same facts as the one we hold today, just with their order re-arranged.

Ideally what I seek from this project is to remove these kinds of hierarchies altogether. I don't want to say that alchemy is "right" and chemistry is "wrong", what I object to is the basic notion of right and wrong here. It's based on the notion of our ideas having some kind of objective other reality beyond that of the world we live in. I think this kind of ordering of ideas is one of the ways we've held ourselves back in science due to ideology.

We need to stop banishing things like spells and el-

ementals and potions from "real" science just because of cultural values. A drug is a magic potion, what else would it be? Prove it isn't! A program on the firmware of a robot is a magic spell. Prove it isn't! And every artist knows art is magic. The only way we have denied that in science is by simply saying we're better than art on the ladder of "reality". This has, again, held us all back. It's led to a century of inaccessible art and incomprehensible science. We need to reunite the strands of alchemy, magic, art, and science.

Symbology

Where to trash magic artists get our symbols? From the natural world, from geometry, from anarchist iconography, and from religious art. We also seek to replicate, but softened by the influence of the natural world, the design aesthetics of 20th century industry. This will be almost a parody or a three dimensional rhyme of sorts, not so much to bring out the function of the industrial thing but to remind us of its form to make us think of where our trash comes from and what we are replacing.

Note that when I say religious art, this is very broad, since much of art through the ages has always been inspired by whatever the artist viewed religion to mean. Religion is our deepest held beliefs which form our world view outside of that which can be proven. Art at its best tries to express what that means, and is often deeply

religious, but takes very different forms due to the diversity of religious beliefs. In particular, however, trash magic will lean toward the "occult" from various Western traditions. Due to the author's non-indigenous Western background, I want to avoid appropriating cultural traditions of which I'm not a part. And I feel like one way to do this is to focus on "pagan" traditions of various kinds, as well as occult Jewish and Christian art.

The anarchist symbology will include the black wild cat used by the IWW and other anarchists, as well as various permutations of the circle A. The following image combines the black cat with the form of the magnetic field from a tiny magnet, symbolizing one of the forces which we will harness in Trash Magic.

Some electrical symbols will also be incorporated, partly since many things we will make involve building electrical circuits, and building those symbols into the art makes things self-documenting. While these form a useful function in helping to make a thing free by documenting how it's put together, they should never abandon form for function: circuit documentation should be a work of art as much as a document.

Secret symbolism in occult art at UAA library: BF1623.S9 G45 1987

Art and the occult, UAA library: N8222.M3.S38 1975

Figure 4.2: Wildcat in the field

Capitalisms Unwanted: a Human Treasure

What is a Trash Wizard?

- What do we do?
- What is best in life, redux
- How the trash wizards teach the world our methods
- What kind of world we build
- Many wizardries, many paths
- How does the value circle work?

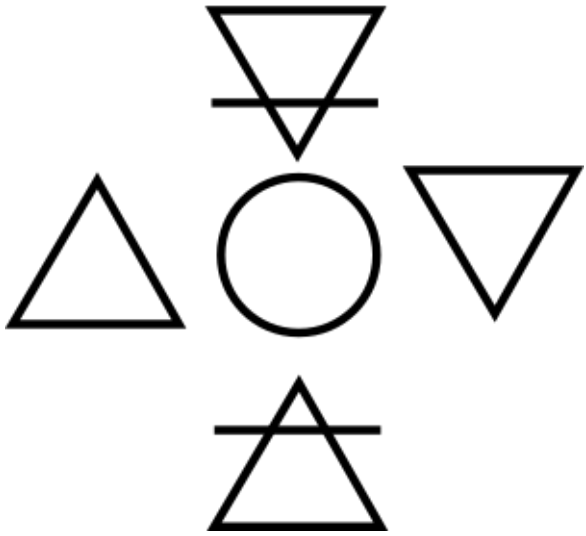


Figure 4.3: Elements

how do trash wizards spread the value circles?

Specific examples of value circle use: manufacturing, food, robots, coffee, R&D, art

Many technical details on trash wizard sticks, how they're used, designs, plans, images, examples, etc etc. on the sticks.

Use of sticks with cars, computers, phones

using the stick to replace the smart phone eventually

Figure 4.4: Squat Sign

What Does the Trash Wizard Stick do and have?

1. built in measuring stick in SI and English
2. build in measure tool for AWG of wires
3. LRC meter that reads out on phone
4. conversion to robot mode where it drives itself around

5. convenient single shoulder strap for comfortable wear like a bike messenger pack
6. random flash sticks which store MP3's of music ripped from youtube on the pi, controlled by the smart phone, and then replayed later
7. speaker built from our technology, reading flash drives out with the pi zero
8. pi zero
9. High voltage storage caps(detachable)
10. medium voltage storage caps(detachable)
11. super cap(detacheable)
12. LiPo Battery(detacheable)
13. direct wire connect silicone and copper switch board for power with fail safes of various kinds
14. screen for pi zero to read out a special dumb ass bat phone
15. measure nonlinear voltage response to impulse of various random blobs you find around
16. can harvest energy using a built in magnet and coil setup

17. water pump always available
18. trash wizard app for phone is set up for physics, interfaces with existing physics packages
19. audio high gain amp with speaker that can get high power sound to do feedback
20. goggles that can interface with various imaging technology using analog displays with vibrating fluids
21. L R and C are all measured analog using the high gain audio stick
22. measure NOISE of all things, including Johnson and shot noise
23.

Trash wizard multi tool

I want the trash wizard multi tool to be able to measure inductance easily. How to do that? I want the L/R time of something to be long enough to see something on the arduino ADC. But what R? If L is 0.001 H and R is 1 ohm, L/R is 1 ms. Perhaps a 1 ohm shunt resistor somewhere.

Or maybe I want to measure the reverse EMF from changing the current quickly through the coil. V = L dI/dT. For a 1k series resistor driven by 3 V we have 3

mA of current. If that can turn off or on in a few microseconds, it should be possible to induce a good fraction of a volt. But given that the sign will reverse, having this go to ground would be a problem for the ADCs on the arduino. So what I want is a 500 ohm resistor going from the DAC to a node between two 500 ohm resistors in series making a voltage divider between 0 V and 3.3 V. that middle node then goes to the ADC and pulses should be visible. This I will not proceed to build and test.

Free Phones of the Future

One of the many idiotic things capitalists say to shut up their critics is to point out that capitalism is the source of the smart phones that anti capitalists inevitably use. These devices are indeed amazing, and are no longer luxury items by any means. On the contrary, they are very much a survival tool used by the oppressed classes now, and it's very dangerous to ignore that role this technology plays. But what aspect of them is so great? The social networking. That's always what you need: access to the web, various messaging systems, and various commercial things like Uber and Lyft.

Does that really need to be a computer? A truly free phone would be a pure communication tool that communicates in a distributed way like fido net of old. the sole purpose of the hardware would be to communicate

images, sounds, text, and to decide where those should go. That's it. What the hell do you need a computer for? Mostly so that The Man can spy on you and figure out how to sell you shit you don't need, and force you to constantly throw more federal reserve debt back into the machine for more advanced machines to get more indoctrination to continue the cycle.

It's all bullshit! Don't be fooled by the dominance of the computer technology into believing that's inevitable. It's not. We can get orders of magnitude more benefit from peer to peer networks than we do today as slaves to the military industrial machine if these phones were all free like freedom, linked up on free hardware all the way. This can actually be the basic informational skeleton of the value circles.

I believe that the hardware can be re worked from the ground up based on our approach to applied electromagnetism to get something with totally new fab. But in the mean time, given that that is a lengthy applied physics research project, what can we do? My answer is to watch closely everything that has anything to do with Raspberry Pi and other "internet of things" projects in the open hardware domain. I say "open hardware" here and not free hardware, because it's not free according to my strict definition: it relies on mine- driven fab and capitalism, and there is IP in the supply chain(and some other problems). But it's way better in terms of open and free than the whole android/apple ecosystem.

as seen here: https://www.adafruit.com/products/2885 (https://www.adafruit.com/products/2885) The pi zero sells for 5 dollars! And it's free like freedom as far as the software goes, as I understand it. The problem of course is that it's not what you'd call a product still. You need to buy a screen separately, and a battery, and some other odds and ends, and then put a package together, get all the software working, etc. It's not trivial. Not insanely hard, but not trivial and also not really as usable as a apple or android. But surely this could change? If people want to work within the system of existing "tech" a fantastic place to focus efforts would be making this technology closer to truly free. This will be a combination of figuring out sourcing logistics on the hardware, making the software closer to what a phone user expects, and writing new software to make more free infrastructure that runs on the free hardware. If a truly free platform were to allow for the kind of peer to peer labor and goods sharing that for profit platforms now have, capitalism might just collapse overnight as people spontaneously are able to work and do things by communicating freely.

Don't like the phone but like "tech"? make a free phone. It will happen one way or the other, but the more ways it happens the better for everyone.

How to Build the Team to build the Technology

I'm clearly not going to build all the things I'm describing here. And even the things I do build, I hope to have what I build be a insignificant fraction of the total number of units produced in the future. How to recruit? Who to recruit? Where will they work? I've been contemplating these questions, and I see several ways to proceed.

Largely the various ways forward will involve decisions about where to be on the spectrum of working inside the system vs. outside. Some choices will involve getting very conventional, and I fear they will end up being coopted by the existing system. One of those would be to structure the way ARPA was in ins heyday. Many top academic, corporate, and government research labs could receive targeted funds to work on problems, where the funds come from various donations and military applied science grant money. The work would then be done by the usual suspects: grad students, post docs, and various staff researchers inside the current system. I think the biggest danger here is that the developed technologies will not be free in the real sense because it's so hard for a expensive R&D lab to ever build a thing that's not based on expensive equipment.

Another way forward is to focus on commercial applications in the old economy. One could for instance build a very reliable and cheap water pump, and build a

rapidly growing for-profit company on that which funds R&D to free technology through its profits. This is, I think, the worst of all possible choices. Capitalism poisons everything it touches. And I think the way I'm going to define capitalism for the purpose of this work is "the belief that value can be measured using numbers". It's that simple. Any kind of money or equivalent value unit that can be counted is the poison we all know from our capitalist nightmare, and that's what I'm going to focus on purging from the technological supply chain.

At the other end of the spectrum, one imagines seizing a abandoned factory building and building the R&D infrastructure up from scratch in a squat environment. I predict that going too far down this path ends with the usual endless war with cops and landlords that always happens when good people try to use land without the System. Even if you imagine buying the land so that there are no direct legal challenges, cops and landlords will be an ever-present problem, as will generating enough federal reserve debt to keep the bastards off our backs. A lot of time will have to be spent on just keeping the site running.

Seizing land and building up the means of production makes sense when you have a working technology that can be instantly deployed and then also broken down and moved later when you need to move. But before the technology is mature, it makes sense to be completely distributed geographically. Also, for this project to work

as I want it too, we need strong cooperation between the developing world and the developed world, and between diverse people living on land that has different types of local resources available from whatever their local trash streams are, as well as the very diverse energy considerations, and the diverse cultural considerations which should be considered early not later.

How does this distributed system work? I believe part of it involves the structure of the actual book document. I don't feel that the Jupiter notebooks are quite where I want them yet, but they're close, and I think that the structure will be based on software that comes out of that basic structure. Users will make modules to solve various technical problems, as well as post new ones, and they'll all be integrated into the combined book. This is, in many ways, what the open source software people do using their git hub bullshit. I think git up is a giant festering piece of shit, however, and loathe most software communities, so this is a tricky game. Somehow the innovations from that world should be used without poisoning the whole project and creating yet another tech bro shit head club.

One way I want to differentiate from a lot of computer software bullshit is by having a coherent narrative. Something that drives me crazy about their culture is that things are so distributed that you can't actually figure out where to start. It's not just that there are forks, it's that there are many forks all the time for everything

and everyone is a giant dick about all of it. I'm not above simply banning anyone with any tech company affiliations from contributing to the main document.

This is a book. A book is a finite thing. As time goes on content will be added, but other content will also be deleted. It will all be archived, but if someone wants to they can approach from zero, start at the beginning, and have a coherent narrative to follow as they build up to actually having the ability to use the technology themselves. There will be various versions to account for many human languages as well as some various tracks that might exist, but all of the parallel versions and tracks must be self contained and linear(or at least with the option of treating them as linear). I need to keep a very close eye on how things progress with the various jupiter like things out there, because it's moving fast. It all has to work on a free trash wizard stick, but that should be fine with the HTML5 stuff that everything now runs on inside a browser. Is there a simple way to go back and forth between jupiter notebooks and a fully compiled .pdf in book format? Surely there is, and if not, it should be some combination of existing scripts chained together.

My job as initial author is to create well posed problems in the first draft of the book, and to make it appealing for people to contribute solutions to those problems. This will be extremely hard to get right on a first pass, and part of getting this whole thing to work will involve shifting that format over time. When things are really

working, the R&D will be all done in the value circle economy, where people are constantly creating that form of value as they do R&D. This has the potential to be a very hard chicken-and-egg problem: the book needs a lot of work in order to have value circles work, but without value circles people can't work on it effectively. That's why this all starts with me working alone in my underwear at home. And remains that way for a while. Because I need to first have the system working with me as the only user, then me and some close associates, then a few "followers" who just build kits, and then, when that team has worked for a few years, more people can ease their way into the system to grow it. Of course as the serial/parallel global crises of capitalist disaster accelerate, we may find that things grow explosively instead. If that happens it happens, but I will plan for something that is built much more carefully.

This blog post was going to go into a list if the types of experts needed to get the various jobs done, but on looking where it ended up going that looks more and more like a useless exercise at this time. I'll build up the vision of what should get built, build my own parts of that technology and distribute them, and then a sort of chemical potential will form which brings in the right experts. It's dangerous to specify exact professional qualifications too early, as it will end up losing out on some opportunities to bring in talent outside the organized technical professions, which creates lots of biases in class, race,

nationality, age, etc. It's much better to pose problems clearly with no jargon, in as many ways as possible and just see who turns up with a solution.

Skeletron: The Wooden Bones of Art

Skeletron is the system that makes the bones of Trash Magic artifacts. Skeletron is simply a way to modify things found in your environment to make them play together well with Trash Magic. Primarily this means gathering sticks, shaving them to be flat on one or more sides and removing the bark, and drilling holes in them. Quarter inch holes spaced about one inch along the line of the sticks is the most basic component of Skeletron. This can be used to do many things, and as more people build it and use it and modify it, it will become increasingly versatile and free.

With a universal wood framing system we can build up many different human sized structures. This can be used to make various shelters, although to do this we will add plastics to the system, using methods of hand plastic welding detailed in the last chapter of this volume. With the ability to make wood skeletons with plastic skins we can make waterproof structures on land as well as waterproof boat structures and amphibious artifacts of various kinds. The combination of wood and plastic in a modular and modifiable way also can be the basis of all the other industrial constructions to be described in this work.

The fasteners to hold the sticks together are all quarter twenty, or one quarter inch outer diameter threads with 20 threads per inch, a very common standard in the US. In Metric countries, the equivalent would be about M6. The M6 and the quarter inch threads are not compatible, but the hole sizes should be, especially if you drill them out big enough to have some extra space around the bolts. Bolts and nuts can be stainless steel if you want to buy some, or melted plastic can be used to make plastic bolts and nuts and wrenches from bottle caps or other similar plastics.

In addition to making large sticks with many holes in them and welded plastic sheets for water tight construction, we have a system for building electronics directly into the sticks. This involves some soldering techniques detailed in the last chapter of this volume as well, as well as the plastic welding techniques to fix in place, strain relieve and protect the circuits as needed.

A drill is needed for this work to cut the quarter inch holes for the main Skeletron sticks as well as to make smaller holes for various wires and components for the electrical circuits. While it can be easy with Grid access to use a simple electric power drill, the ideal Trash Magic industrial production will involve a direct drive drill driven by flowing water.

Chapter 5

Universities

This link is key: `http://undercommoning.org` There is already a whole movement. They have the ideas and the people and the strategy and tactics, so all I need to do is cite them a lot and add the technical industrial components.

Universities: Visions of Utopia

If the university campus lived up to its potential it could be a true paradise: essentially a giant garden filled with buildings for studying and creating knowledge. Amazing! They are usually situated on some of the best land to be found anywhere, have great access to everything needed in life, and have dense urban style housing in a pastoral environment which allows for a simple, car free life.

University campuses are often physically spectacular. They often have some of the greatest examples of art and architecture of available both used in their construction and lovingly maintained for in some cases hundreds of years. It is typical for them to have wooded areas owned by the university, as well as often running water and in many cases access to very large bodies of water. University campuses are often more self contained than most institutions, creating their own power and managing their own utilities, and having a fair amount of autonomy from local government.

Brief History of the University

Where did the universities come from?

University as a challenge to secular corporate rule.

Looking up sources at UAA library.

The universities of Europe, 1100-1914 : a history is at LA627.R82 1984

This needs extensive library research.

Undergraduate Education: Broken Promises

The college education has become a key element in the great lie of the American middle class dream. It is also a major factor in the older generation destroying the opportunities they had for the younger generation.

College has become just another capitalist cartel, exploiting the hopes of young people in exchange for a life of debt servitude. Young people are still told by their elders that a college education is needed to enter the middle class, which is supposed to be a good thing. They're told that the price is justified by long term earnings. Then they're sent off to live in a party resort for 5 years where they shuffle through a series of pointless and irrelevant classes, and wind up with a bill of many tens of thousands of dollars(this is primarily an American problem, but the neoliberals will bring it to your country soon enough if they're not crushed at the global level).

And what do we learn there? Theory! Propaganda! How to write papers no one will read about stuff no one cares about. 100 year old science. At this point defenders of the System start howling about "pure knowledge", by which they mean theory over "applied knowledge", by which they mean actual knowledge about how the world works. Theory is a virus, a disease, and a religion, and it has no place here.

What should we learn? Same subjects, but useful. Why can't biology majors make drugs? Why can't physics majors build a flying drone? Why can't chemistry majors build a water desalination plant? Many subjects should, I think, be totally eliminated, as they have no real value, such as economics and computer "science".

Science Grad School: The Ponzi Scheme

You don't have to go to graduate school to see how much it resembles a pyramid scam. Suppose any one professor has about five graduate students at a time, each of whom takes about five years to graduate with a PhD. If a professor does this for 30 years, they will create on average one PhD per year or 30 PhD's total. Now suppose all those PhD's find jobs similar to what their advisor has. This is possible only if the size of the field increases by 30 times in 30 years. Very crudely this corresponds to about 12% per year. Given the expansion of the physical sciences and their satellites in the years during and directly after World War II, building a scheme like this in those years actually made some sense. However, those days are decades behind us, and now as research budgets shrink and schools, companies, and government agencies are systematically destroyed by politics, this math looks much more like a pyramid scam than a response to society's needs.

As a grad student you will *probably* never get the job you're supposedly being trained for. But you will dedicate 5-7 years of your life to helping someone who *did* get that job to continue to climb the academic ladder. The people at the bottom of the academic pyramid spend their lives working to help the people at the top, and then are mostly cast aside.

The tenure clock then puts yet another opportunity

for exploitation in the career path, making yet another way for people now well into middle age to work long hours for more years to build up an academy that they might then be cast out of.

Hollowing Out of the Academy

There are many factors that have contributed to the downfall of the university system over the last few years. I would argue that since Ronald Reagan was elected president of the United States in 1980 there has been a coordinated ideological war against all culture that might exist outside of the profit system, and that universities have felt the brunt of this particularly hard.

A robust, healthy, independent, and publicly supported university system could provide a real balance against mainstream corporate power if it existed. It is therefore strategically important for the lords of global corporate rule that they be as controlled as possible by corporations and the central government so that they cannot exercise a check on those forms of power.

Intellectual Property

Intellectual property deserves its own section here because it has been so corrosive to the culture of the academy in so many ways. This manifesto is opposed to all forms of private property, and particularly intellectual prop-

erty, but the patenting and copyrighting of work done in universities is particularly evil.

It is now standard practice for public tax money to be spent to create knowledge which then goes into papers behind a paywall protected by brutal copyright enforcement and into patented or even trade secret knowledge. If the rule of law actually meant anything this would clearly constitute a criminal theft from the public. The fact that this is *not* considered a criminal act is in fact a major indication of the evil nature of the capitalists' so-called "rule of law".

Potential Paradises

University Occupations, Phase 2

Any history of any radical movement will inevitably involve student occupations. Students typically take over some space on campus, keep the land from the cops, and carry out various protest actions or teach ins over some number of days or maybe weeks. In some cases they stand down after actually getting some demands met by the administration.

Case Study: MIT and Harvard

MIT(Massachusetts Institute of Technology) and Harvard share a strategic position along a tidal waterway,

the Charles River. I will look at both of them here and point to how an insurrection in either institution could grow out into that river and have lasting impact after the initial event.

And what of the Charles River?

`https://www.worldcat.org/title/charles/oclc/990111` looks like a good reference, can be found in denver libraries and dc, but not anchorage.

- How much land owned?
- How much is arable?
- How much is already zoned for ag?
- What water resrouces are there?
- number of staff, students, alumni, faculty
- How many people could Yale support?
- Holdings outside New Haven
- Yale Singapore
- Repurposing the Endowment, total divestment from capitalism
- political and legal process of re-writing the charter of the school, changing governance

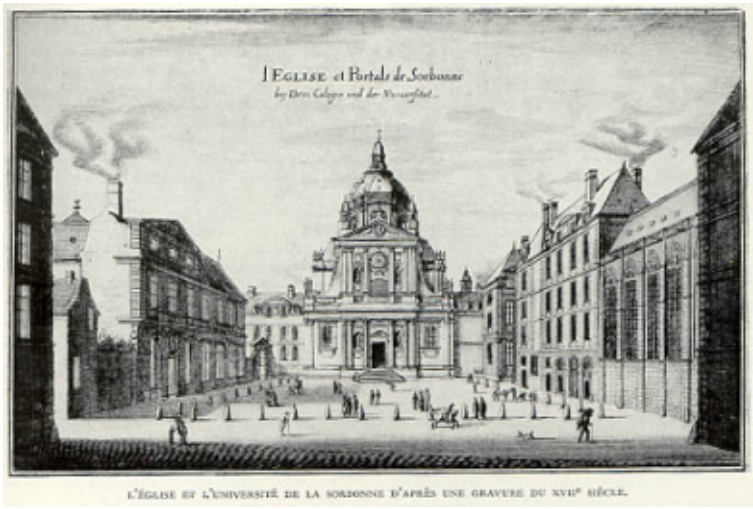
yale history: https://www.worldcat.org/title/yale-university/oclc

yale land holdings:

`http://sustainability.yale.edu/planning-progress/areas-focus/landscape`

charter: `http://www.yale.edu/sites/default/files/files/University-Charter.pdf`

Case Study: University of Paris(Sorbonne)



L'ÉGLISE ET L'UNIVERSITÉ DE LA SORBONNE D'APRÈS UNE GRAVURE DU XVII^e SIÈCLE.

Figure 5.1: The Sorbonne

https://en.wikipedia.org/wiki/University_of_Paris

https://en.wikipedia.org/wiki/University_of_Paris_strike_of_1229

Case Study: Roosevelt Island

Need to go look up reports on this project, detailed maps of the island, go see it and investigate, take pictures.

`https://en.wikipedia.org/wiki/Cornell_Tech`

Figure 5.2: Map showing location of Roosevelt Island in the East River, between Manhattan island and the Eastern boroughs of New York City.

this chapter should have a section with a detailed example

maps, tables, really dig in and figure out the strategy and tactics that could be used, maybe have multiple examples, small liberal arts, huge public school, elite private school, community college in a big city

The Universities are a Disaster

- Academia as pyramid scam
- Academia as tool of the military industrial State
- Academia as a marketing tool for the banking cartel
- Academia: where ideas go to die
- Academia: it was here before capitalism and it will be here after
- Has traditionally been a part of various religions and patriarchal systems connected with them

IP is key to how bad it is, academia after the re-occupation of the campus all property will be banned from campus.

But they're really useful to us

Back to basics: knowledge, teaching, philosophy, technology, culture, books, land, food and energy

Universities must be Occupied and declared independent

This should be across disciplines and outside of the capitalist class system, bringing in workers, locals, students, teachers, researchers and everyone else involved. Seize the legal control of the corporation that is the University, and you will have a power that States must respect.

Taking universities over can be a huge international beach head that goes around all national borders.

Important reference:

Universities, Inc.

call number: 338.43378 WASHBURN

DPL description:

"Our federal and state tax dollars are going to fund higher education. If corporations kick in a little more, should they be able to dictate the research or own the discoveries?During the past two decades, commercial forces have quietly transformed virtually every aspect of academic life. Corporate funding of universities is growing and the money comes with strings attached. In return for this funding, universities and professors are acting more and more like for-profit patent factories: university funds are shifting from the humanities and the less profitable

science departments into research labs, and the skill of teaching is valued less and less. Slowly but surely, universities are abandoning their traditional role as disinterested sources of education, alternative perspectives, and wisdom.This growing influence of corporations over universities affects more than just today's college students (and their parents); it compromises the future of all those whose careers depend on a university education, and all those who will be employed, governed, or taught by the products of American universities."

Chapter 6

Rumbles of Robots

Robots!

Robots! The word is loaded with both promise and peril. We dream of robots that do all tedious labor, freeing humanity from it, as well as of robots that might take over and kill us all(fiction seems to favor the latter).

I also believe robots can be transformative, although I think we should look at much of the hype from today's "tech" companies with many grains of salt. Self driving cars and autonomous battle robots have mostly turned out to be worthless hype machines useful for making Silicon Valley hucksters rich and not for much else.

Here I will look at some of the robots I think we should build with Trash Magic which can make a better world for caring for one another and having adventures,

which is what this book is all about.

A Rumble of Robots

The collective noun for robots is "a rumble of robots." I'm not sure where I heard this, I think on of my friends may have made it up, but it's so perfect it's too good not to use. So I want to talk about rumbles of robots. In particular the difference between robots used for consumption and for production.

Amazon is in the process of building robot based infrastructure for delivery. This is fundamentally a consumption driven project. The main initial figure of merit in the growth of their network will be coverage: the more potential consumers are covered, the better. This will mean that it is optimal for robots to be as far as possible from other robots. But how does this picture change for production?

Rumbles of robots are very common on the production side of things. Those who produce cars and computers and the like often have rumbles of robots, with humans just as technicians who run the machines. Much like a cow hand or shepherd, I think there should be a name for those who herd rumbles of robots: rumbler. So the trash wizard is also a rumbler. And the trash wizard stick is like the shepherd's crook: a tablet that drives a IoT network that consists of your rumble of robots.

That is what seizing the means of production is really all about. It's not about seizing an existing factory, which will be based on existing methods, or about building a primitive system that can't compete. It's about building rumbles of robots which can reproduce themselves by harvesting free materials to make more, and then rumbling them around to build what else you need.

Key elements of the trash wizards robot rumble are mobility and versatility. They will run off of locally harvested energy, and be programmed to gather energy as needed as well as materials. They should scale in that the robots you need for a 10 bot rumble are not so different from a single roninbot or a 1000 bot rumble. They should be able to reproduce from found materials and forage for those materials with some simple guidance from the rumbler. That is the plan.

The Tripod and Multitool

The basis for all Trash Magic fabrication will be the tripod. a tripod is exactly what it sounds like: three sticks, joined at the top with wire or tape or rope, as well as with guy wires at the bottom if needed, with the bases of the three sticks planted in the ground for stability. A rock hangs from the center to keep it steady.

Each of the three sticks shall be of Skeletron. Each shall be the size of the Standard Trash Magic Staff. A practitioner of Trash Magic shall have the power to de-

ploy this at any time, at any scale and with any tool. Full xyz motion is possible with wires that are fed through holes or wheels on the sticks, and can go to stepper motors for drive and/or wheels on potentiometers. Each wire connects to an arduino that runs a three terminal pulsed transport measuring protocol. The ADC signals are amplified and converted with some math to an audio signal, visual display, and or vibrotactile interface.

This probe can be heated with the wires, can do local electrochemical work and measurement, measure nonlinearities of all kinds, and can thus weld, plate, edit, implant ions, plastic weld and plastic re-shape, signals also displayed in a GUI in a smart phone if needed but can also not be, can have no "smart" computer at all, just dumb computers. Sensing can be capacitive, inductive, resistive, frequency dependent or not, nonlinear or not, gated or not. Many different sizes and weights can be used, gear ratios can be changed on the fly with various interchangeable wheels. Everything is modular.

Thermal regulation of processes can be carried out by moving the position of a suspended cauldron in 3 dimensions relative to a fire at the bottom of the tripod, using a microprocessor and feedback on a thermometer to regulate the temperature to a fixed point.

In a cluster of Trash Magic industrial production there can be many tripods, all in a network, connected by plastic plumbing, electrical and data connections, and zip lines that move materials from one to another, setting

up ad hoc nodes in an assembly line that can be grown and shrunk on the fly.

Tripods can also support roof and wall materials, making shelters that people can sleep and work in. Tripods can be trees that already exist. Tripods can also be completely submerged for doing intricate work on the bottom of a body of water. In zero gravity another set of sticks are needed, and another cable and springs. The materials for a pair of tripods should also be able to become the skeleton of a simple boat, which can then deploy mini tripods to the water below it.

Tripods can be fractal, with a small tripod lowered from the tool head of a large tripod. Smallest tripods should have Angstrom resolution and atomically sharp tips, biggest ones are hundreds of meters tall.

Elements:

3 skeletron sticks

wire or rope for lashing

knife and drill and pliers to work the stuff together

trash magic philosophy engine style motor(one sided four pole stepper, water proof). all made from plastic bottles, HDPE milk bottles and HDPE caps from soda bottles, coils unwound and re wound from big old AC motors and transformers. Transistors and SoC devices are salvaged and hacked from internet routers. Micro controllers are salvaged from thermostats and the like. Op amps are salvaged from audio electronics of various

kinds. motors designed to run as “dumb” steppers or DC brushless fast motors with feedback using pickup coil(s).

IOT device that has enough outputs to drive all the motors, e.g. the Pi zero or equivalent SoC

smart phone or tablet to control the IOT thing remotely– if there is VR or AR, it happens on this machine so that it’s off the shelf and tracks whatever the tech assholes come up with as it develops.

sensor wheels that can pick up position of a passing structural wire as it goes past as the work moves, along with arduino to read them all out which connects to the IOT platform and out to the tablet, this allows full xyz input by the user or recording of position while a user works the machine by hand

LED illumination pointed at work space from the Trash Magic sticks, these have RGB capability so they can signal various types of data

speakers and amplifier that can play sound from the tablet, IOT device or direct amplification to get audio feedback on the signal

arduino that does the three terminal generic electrical measurement and drive with pulse width modulation and various ADC pickups, this connects to the raspberry pi, which then puts out light, sound, and vibration to feed back electrical data to the user

various heated tools and electrical heaters which can be driven by the suspending wires–need lots of thermome-

ters for feedback, which can go to arduinos that connect to the pi over serial or bluetooth

hydro electric generators with tethers so that the whole tripod can be run by the tide or stream nearby, close but not necessarily under the tripod(although they could be!)

generic pumps for water and gas–two drive coils and a pickup coil, this is also the vibrational driver, see below, same tool, can be either on the moving piece or stationary while the work piece is moved.

vibrating tool which can vibrate a heavy rock-weighted tool that can, over many hours, under moving water, carve arbitrary shapes into stone, vibration also used for plastic welding with heat

soldering tool connected to Main Trash Magic Power

designs for many sizes and types of wheel so that torque can be transformed up or down, all fabricatable from bottles.

LiPo batteries and bigger ad hoc electrochemical cells for storing more energy, possibly a water "tower" where water with stored potential energy can flow pressurized fluid through the system

high voltage generator for plasma work etc

Octahedral Ball Drone

The octahedral ball drone is a octahedron made of three intersecting sticks, with a flexible joint. Each of the 6 ends has a 2 degree of freedom +/- pair of control coils

and magnets with some significant amount of effective length change. Drivers can use the natural dynamics of the flexing rods to make efficient rolling motion. I imagine making the first one based on a LiPo battery and Raspberry Pi, with wooden sticks held with a rubber central ball that the sticks can get pushed into. I imagine the sticks being a total of about 12 to 15 inches long total, so that each pod is about 6-8 inches from the center, and can flex by about 2-3 inches, or 20% to 50% of total. The amount of play should be just barely more than enough to get the full sphere effect for maximally efficient rolling. I imagine for the very first version all coils are driven by dumb feedback and it's an art piece that rolls around in all directions chaotically until the battery dies. Then all the boards get tied together to a central Raspberry Pi, which gets onto the net for control by a remote console. Then the code task gets solved for the simplest possible rolling motion with directional bias. Then some kind of simple chase algorithm is written so that it can track down a target that emits some kind of signal. This demo could launch a whole robotics project which can be a main support column for The Project.

Wind Desert Drift Robots

Rolling robots with windmills, they roll, then gather wind electricity into a capacitor, roll again, and repeat. They can go for hundreds of miles with no intervention. The

instinct to go a certain direction based on navigating off of the sun is programmed into the physical hardware. After some long time, maybe many years, the machine calls for help, eventually someone finds it and follows the instructions for repair and improvement. With generation after generation editing and helping the thing exist, it can exist for hundreds of years, slowly cleaning up wasted sacrafice zones of the old capitalist world.

There are so many machines to build like this! Machines that comb the ocean for contaminants, using waves go get energy to move around and sort and grab stuff, potentially floating around for years before being found based on a data stream that pulses out periodically, and eventually another type of robot tending robot can grab it, extract the materials it's gathered, and bring it to a floating factory robot rumble. This kind of robot is important for the ecosystem of the jungle city in the ocean-inundated coastal post apocalypse.

Free robots like this are a rational response to the fact that the existing system has created sacrafice zones. These sacrafice zones have negative economic value in the old system, making them freely available to be absorbed into the anarchist industrial infrastructure. This is key: in order to avoid getting crushed by the forces of the old system too early our movement must exist in the fringes of the current system, where the old ways have created land of negative value. The very fact that land can have negative value, that this is a concept that people

accept, should be yet another red flag that assignment of numerical values to real human values is a morally bankrupt act.

This should always be the goal of free technology if it wants to grow exponentially without a lot of resistance: the input must be things deemed of "negative value" by the old system. Unlike most projects in capitalism which constantly drain everyone involved more and more over time, creating generation after generation of institutional burnout.

Cyborgs

birds, fungi, marine mammals, cephalopods , trees, rodents, trees...

Building an Ent

The fractal mater reactor should be alive. Trees, bushes, grass, etc. can grow all around it, with roots going into various fractal channels which provide nutreince. These liquid spaces can have various animals and fungi and microorganisms, creating a whole ecosystem. Imagine an island built up of such mater, the size of a small building, covered with trees. Ambient energy is used to slowly build up and discharge electrical energy to operate philosophy engines which slowly walk the whole thing across the landscape. With little or even no human intervention,

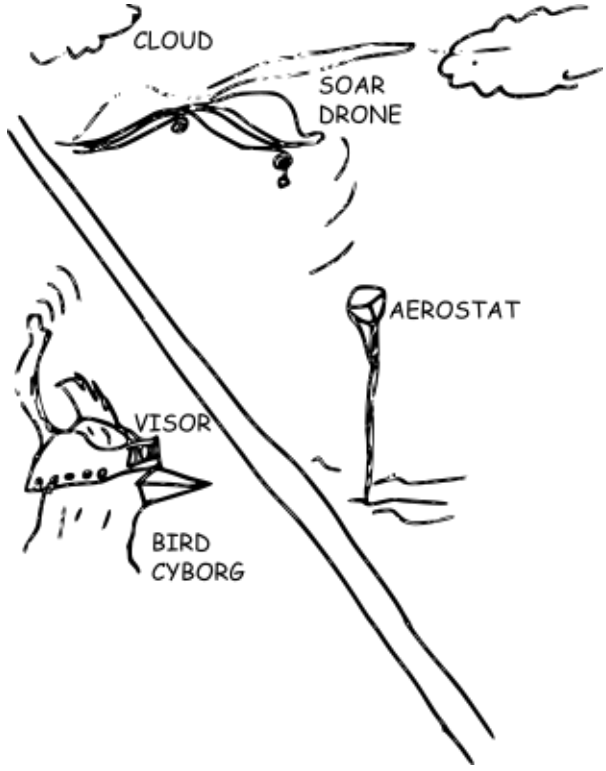


Figure 6.1: Bird Cyborg

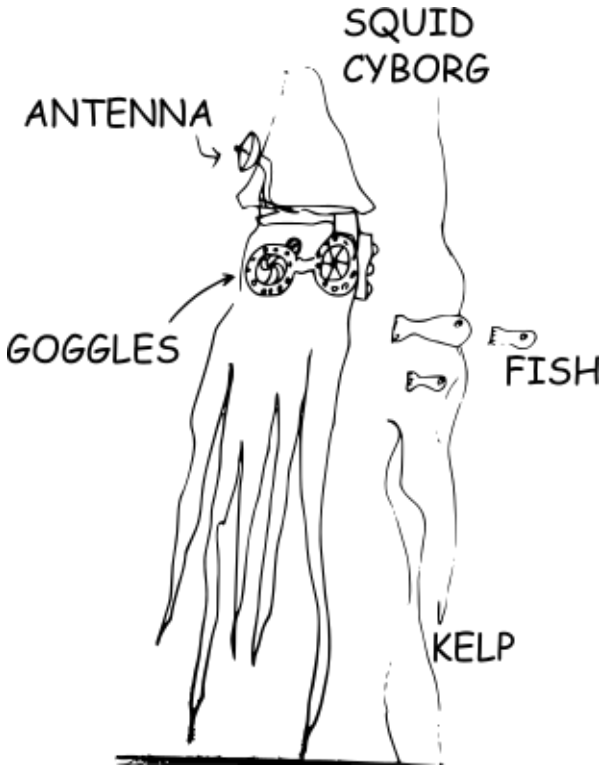


Figure 6.2: Squid Cyborg

this limbering living giant might spend decades crawling up and down hills scouring for junk cars, which it turns into a ever growing robot rumble that it can give away to any passing humans for free at any time. Building this kind of thing in the ocean can be incredibly powerful. Whole floating islands filled with fractal reactor technology can wander the high seas, with the humans all underwater in bubbles to ride out storms, picking up storm energy and sea junk, and building a every larger floating city deep out in the ocean. This aquatic fractal techno city could exist even in a dead world of violent storms and acid oceans and extreme heat. That's part of why I hate the liberal vision of fighting global warming by trying to make everything into Denmark. It won't actually work, and then you still have a breakable society. Sure our society is destroying itself, but so what? Let's build a million new ones, not just one. And let's expect a future not of competent bureaucrats carefully tabulating the giant World Spreadsheet so everyone can live the life of a middle class urban Sweede but a world where ice ages and supervolcanoes and nuclear wars and devastating earthquakes all happen and where we roll with it and have adventures.

Start by building and documenting some actual robots, make a rumble, rumble the rumble with the trash wizard stick.

1. hopper dumb robot

2. hopper with a brain using raspberry pi for browser to pi to board to motor robot control
3. roller robot
4. rolling ball robot
5. hopper rumble
6. make a mobile robot that can use a hot tool to rework thermo plastics
7. floating robot that can re work thermo plastic(loop back to these on fractal reactor chapter)

Flying Robots

Everyone is in such a hurry! Most aerial drones for personal use today(2016) are designed to move very fast for very short periods of time. Generally with four propellors pointed straight up, they can take off fast anywhere, go in all directions fast, dodge fast moving obstacles, and often only last a few minutes. If broken, they have numerous small parts which can be very hard to fix.

Quad copter personal drones are great capitalist technology: they break easily, cost a lot, do very little, need constant upgrades, and are mostly "useful" for entertaining the techno-priesthood and annoying everyone else. Not surprisingly I see much that can be improved here.

The first way I would set about making drones less useless is by making them float instead of fly with propellors. Given that they're both small and don't have living

cargo, I would say the arguments against hydrogen for lift are mostly obsolete.

How should motors work for soaring drones? First of all, if the thing is large enough it can float on the circular current patterns in the upper atmosphere, holding position with no mechanical work done. But what about motors for guidance? These motors should be electrostatic, powered by extremely high voltage giant balloon capacitors which are the main body of the soaring drone. Using two very light polymers in very thin sheets with opposite positions on the turboelectric series, it should be possible when far from the ground to generate *extremely* high voltages very easily using the mechanical energy source of the rotating air currents. Electrostatic motors can then run off these, also built from thin polymer sheets with thin metallization. No magnets and no copper coils! It's nutty to use the magnetic field for high altitude low power low speed motors, they should all be based on electric fields, because it's easy to get megavolts up there.

How Robots Reproduce

Not on their own! With help. Robots can always ask for help, and it is our task as their designers and creators to build the information into them in the form of works of art that makes it obvious how to repair and extend the robot. A robot should also be constructed in such a way

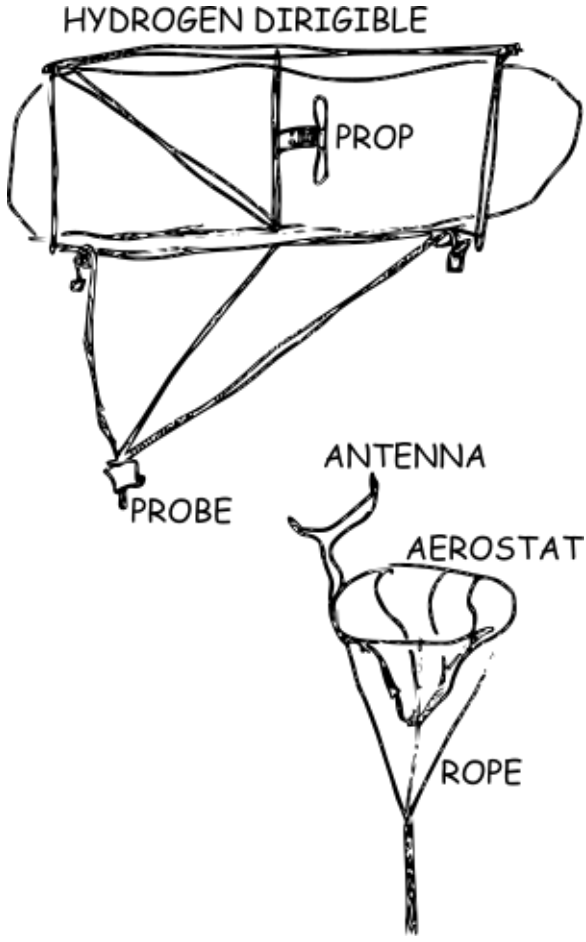


Figure 6.3: Hydrogen Drone

that it is its own means of production: the components of the robot can be used as a machine to build more robots like it. This will require human effort, but both the physical tools and the information required to learn the skills to duplicate the machine are built into the machine and obvious to find and use. Modern technology is designed to scare you away from modifying it or interacting with it in any deep way. We seek to build machines that do the opposite: invite the user to get more deeply involved, building more, documenting that process, and extending the technology themselves for others to use.

I will illustrate this with an example. One of the simplest robots will move itself around looking for energy, then when it finds some(generally a fast moving water body like a creek) it will turn itself into both a power plant and a chemical plant, storing energy and chemicals extracted from the water(targeting human industrial waste of various kinds). This will involve a computer, some motors and some sensors. Other machines will be involved in large scale computer fabrication as outlined in other sections of this work.

Littoral Robots

Add: littoral robot rumbles which can use tides and river currents to generate electricity to propel themselves upstream. Can be amphimious, use water to charge but land to move, can move with hopping, jumping, walk-

ing, rolling, and slithering. Littoral trash cleanup robots are fundable, can make a huge difference in cleanup of a waterway, and also give us free source material for more building.

Hopping, rolling, walking, running, jumping, driving

Robots with different times scales, centuries of work, or hours of lifetime

Something that I think needs to be investigated in robot design is time scale. Capitalists like a certain time scale– the shorter the better. But without capitalism and its obsession with short term growth and profits we can set times scales on hundreds of years or even long in some cases. Suppose an area of land is contaminated with plutonium or some other radioactive heavy metal. It might be there for many thousands of years, making the land uninhabitable. Thousands of years, but not forever, and plutonium has uses even in a peaceful society without rules. Why not clean it up?

Perhaps the robots that clean plutonium will grow their own biofuel to get energy from the sun and slowly pick their way across the land, working with cyborg worms and fungi to dig up the atoms and move them together and out of the water table. How many processes of atomic

or molecular transport open up when we allow a process to take thousands of years? Many. I'm sure capitalists already use the term "geological engineering" but I would say that to truly apply that term, you should be carrying out a technical/artistic endeavor which takes place on a geological time scale. That means it has to be *very* easy for future people to understand, maintain and repair. It also has to anticipate future geological changes, including catastrophic ones like a volcano that destroyed all life on earth for a billion years. And it should have time horizons that stretch well into the 10's of millions of years. What's your hurry! If we were not all hounded by debt to capitalists we could take time to really work on hard things like plutonium cleanup one atom at a time.

rumble jacks

Imagine the following drone/robot: magnets on duct tape with 2 drive coils each are on the vertices of a octahedron made from a star of sticks with the brain and energy storage in the middle. With the right kind of intelligence, all the magnets can move in a coordinated way to roll the whole ball like a jack in the game jacks. Each jack is aware of the position of its neighbors, and together they make a rumble of robots that act like a herd of sheep. Hence "rumbleJack" for the rumble of jacks like robots.

This technology can be used for all sorts of long slow land cleaning processes. Rather than try to maximize

battery life, they will use capacitors to store energy, and recharge the capacitors from ambient energy. For a rumble of jacks in the prairie, the obvious source of power is the wind. Ideally, the wind will be used to create energy which will immediately go into directed propulsion. This might be slow since it depends on gusts, but it can go on forever, so slowness becomes ok. This is technology that you would deploy to spend 1000 years cleaning up a sacrifice zone, where you want no outside energy or materials to be needed at all and for the rumble to keep doing its work for hundreds of years. Also, obviously, clearing of mine fields is a immediate application. A rumble of tire-sized octahedra could potentially roll themselves at 10's of miles per hour, keeping up with a car or truck and making it possible for the rumble to proceed in a mob ahead of a motor vehicle, taking out IED's in real time. The rumble could end up in a convoy geometry, stretched out over the length of the road, doing recon ahead and tracking behind to see what's happening after a convoy passes. In these applications it probably makes sense for the source of power to be the trucks or cars in the human/freight convoy, with individuals in the rumble cycling through the charging station and back out into the rumble.

Going back to the plaines discussed above, this is a great tool for agriculture. Even just gathering. A gathering rumble could go out and gather roots and berries from the countryside in a quasi-cultivated area. These

roving balls could be picking up and dropping seeds as they go, mapping where all the useful plants are, and also harvesting as they go, taking wind sun and water as energy sources as needed, then spending energy when it's available to do the work.

Another robot rumble I want to build that is closely related is the slithering water robots. These use the usual magnet and coil arrangement to create a slithering motion in buoyant objects, which can then smoothly cut through the water. The fact that this has not been widely deployed is totally insane: the same drive can be used in reverse to get electrical power out of wave action. If the length of each robot is a few wavelengths, the whole thing will be forced into a wave which can create EMF as the magnets move, which can go into the storage capacitors, then released to change slightly the nature of the serpentine motion to direct the drone in a specific direction.

These can be incredibly powerful technology! The ocean can be a fantastic source of raw materials for the trash wizards. Note that for neutrally buoyant drones, this can serve to move them through the water below the surface. One mode of operation might be to cruise a few meters above the bottom of the ocean, scanning for stuff to salvage, then dive and grab rocks to be negatively buoyant once a target is found. With just barely negative buoyancy, the rumble can float just above the target as they pick it apart. They then drop the weights, rise up, inflate bags to float(everything is made from rub-

ber, and reversible air/vacuum/water pumps are in all things), and pull up and bring material back to assembly centers, which can also be floating robot rumble factories. With ocean currents and waves as an energy source, and no hurry, these robots can work as slow as they have to, slowly making more and more of themselves until they can have a global impact on ocean cleanup.

The water based propulsion system also is very appealing for boats. I want a boat that runs on wave action, wind, and tides, to grab energy as it finds it, and then use it as needed to move toward a destination. I can imagine this being just about kayak or canoe sized. I could also imagine a freighter that is meters or even 10's of meters long. That sounds small for a freighter, but imagine, again, that they're a huge rumble that can be easily scaled up. This can be a freight swarm to move materials across water.

One more thing I want to talk about relating to these technologies: the serpentine gliding drone. This would be made out of very thin light frame with large thin polymer wings to allow for gliding. Magnet-coil drives are used to pulse the shape to optimize gliding, and to interact with turbulence(linear wind won't work because we need relative motion up in the air) to acquire energy,probably in the form of *Very* high voltages because that is most compatible with being high up. Perhaps electric fields that exist due to natural weather can also be used for various electrical things up high. A flying swarm that

can glide and gather energy and never have to land if the conditions are right has many applications. Mapping to gain information on materials for trash wizards to salvage is an obvious application. This type of flying serpentine glider can also be used as hardware for data transfer by flying flash memory. Donors like this are also a fantastic source of much more granular weather and climate data than are now available. This is useful in the long term for practical climate and weather science studies to deal with mitigation during the coming storms of the next 200 years from climate change. But they also have use for short term weather sensing tasks: tracking down storms that can be used as energy sources for very large scale projects.

What about scaling these robots way up in size and weight for use inside storms? One could imagine giant metal gliders in massive rumbles of 10's of thousands or maybe even millions of units, all ripping around in a storm could over the ocean. These generate giant hydrogen-filled blimps which then gather in a huge rumble to go turn back into useful work near a settlement or floating factory.

The Anthropocene is here. Like it or not, it's here. For the next 1000 years our planet is going to be dominated by the actions we choose to take as a civilization. If we stay on the track we're on, the atmosphere and oceans heat up, massive desertification destroys wet ecosystems while rising oceans eat most of our cities, and the oceans

become a toxic waste dump that cannot sustain life. If we do nothing that is clearly what will happen. Or something worse involving nuclear holocaust. Given these alternatives, what difference does it make how drastically we change things in the sea, air, and land? The opportunity to simply not let civilization get big enough to destroy the world has long passed us by now.

So is it so wrong to imagine the whole landscape filled with these lumbering rumbles of rolling, slithering, hopping, and gliding robots? Is it wrong to let them reproduce with human help, but with very little labor-time, allowing groups of people to build endlessly expanding rumble spheres around the world to create a world of total abundance? I say that it is not wrong. Maybe if there were a way to go back it would be a hard choice to do something that disturbs the balance of nature like this, but there isn't.

This is what the trash wizard wants to make possible in the world: endless streams of material and data moving through the physical world with robots made from trash, which encompass our whole human environment. Maybe not the whole world, but enough of it. A world of abundance using the rumble sphere and value circles could exist outside of the states and corporations. It does not need land, just someplace to move to–it is all mobile by default. The trash wizards build the needed expertise up and document it and teach it so that any group of people can create this kind of culture anywhere, spe-

cific to their individual cultural needs and the available resources in whatever geographical area they're in.

Chapter 7

Free Drugs, SlimeZistors, and Ion Magic

Technology Should be Slimy and Dirty

Look around you. We are bags of salty dirty water, and we are surrounded by mud and dirty rocks on all sides. This is the world we live and grow and thrive in. It's how our food grows, it's how our waste is disposed of, it's how we get our raw materials and how we dispose of our "trash".

And yet this is not how our technology is.

Our technology is, instead, obsessed with the clean and "pure". It is obsessed with order, with perfect rows of

things, with straight lines and perfectly geometric circles. The very structure of all our technology represents our worship of numbers and math and military order, as well as of mining and minerals.

I will go into more detail on this later, but I believe the structure of the modern micofabricated circuit is a product of the white supremacist ideology of the far right lunatics who started Silicon Valley. They were, like all of their kind, obsessed with "purity", order, and forcing everyone to march to a perfectly timed clock. This is borne out in a machine architecture which they pretend is a product of some kind of technical evolution but which is just as much a function of their capitalist religion as the rows of decorative stone columns they out outside their buildings of power.

If, rather than Evil Machines, we want our technology to be more human and more life like, it should resemble what we see around us in the living world. This means it should be largely filled with and immersed in dirty water. And should be capable of moving fluids and gasses around at around atmospheric pressure, with simple circulation systems.

Another key distinction of living systems is that they do not distinguish between material transport, data transport, energy and electrical transport. All of these involve the flow of ions and various big molecules through fluids.

Our non-living technical systems crudely split these functions off from one another. We have banished pure

information to the domain of "computers", all controlled by the all powerful Master Control Program of the Central Processing Unit. Fluids flow as needed for cooling for chemicals, but are clearly lower in the hierarchy than information which rules all in today's "tech" world. Ions in fluid rarely take a deliberate role unless it's in a living system and cannot be avoided(people drinking sport drinks with electrolytes, or use of acid in car batteries).

What is Fluidics and why do we care?

One type of magic that must be wielded if we expect to have a decent life is potion making. This means mixing fluids, moving them around with pumps, compressing them, running electricity through them, and also doing things with gasses of various kinds. This is needed to efficiently compost waste at a high speed safely and to build up plant growth infrastructure fast for food production. It is also where novel chemicals and various life saving drugs come from.

Light Magnification and Projection

Build lenses into sticks that can magnify and project the magnified image. With the ability to project microscopic things, it should be possible to do real time display with millimeter scale vibration of fluids and suspended objects

in fluids. This could be the free analog scope I've been looking for.

There should be both a projection system and also a system for direct projection onto the eyeball of the user in a goggle configuration. Essentially the standard microscope configuration but with better ergonomics.

clean water

clean water is CRITICAL, need to research existing tech here, talk about alternatives.

Rants about free transistors vs. Fascist Transistors

from the blog:

The channels in the reactor should not just be able to take water, water should be in them most of the time. If the reactor is just barely partially submerged in water, it can get power from waves and tide or current in a river or stream, both for generating electricity and as a direct source of hydrostatic pressure to push materials from one "side" of the fractal reactor to "the other". I put scare quotes around side and other here because it's not really going to be arranged as a simple in/out machine, but will have many channels that direct materials around.

Having the channels be filled with water means that robots can be made to be neutrally buoyant or close to it, and propulsion along the channels of the system can be caused with pumps rather than some kind of motor on the actual robot. Thus a "dead" robot can be directed to a location in the system without being powered up at all, then can park on location where the work is to be done and absorb energy from flowing water to use to do mechanical and/or chemical work on location.

The motion of the water can be used to generate electricity which also splits water into gaseous hydrogen and oxygen. Pumps could be used to liquify the H2 in some cases as a more dense energy storage medium. Having oxygen available all the time is useful for chemical reactor chambers because you can use oxygen plasma to clean surfaces in an aggressive way to ready a chamber for a new process. And H2/O2 gas torch can be used for melting glass and various simple welding and heating tasks. Finally the re-uniting of the H2 and the O2 will create pure water which is needed for humans and plants.

Just the wave or stream powered desalinator and burner that can run with no intervention is a technology very worth building ASAP. Running water can turn a turbine that makes DC AC power which is rectified and smoothed to DC, then drives electrolysis, saves it up until a gas reservoir fills, then an electric spark from a step-up transformer from the generator fires, reuniting the O2 and H2 to form pure water, which falls into a water

reservoir which can be of arbitrary size. Over time, this could sit for months building up fresh water very slowly, making it always available in that location. This must be built! If it's possible to use the metals in gas powered cars to build fuel cells, this could be the basis of a primitive hydrogen economy.

In addition to power, locomotion, hydrogen and oxygen, water can provide many other useful chemicals, many of which are unwanted contaminants which will be removed from the water over time. Ocean water in particular can yield vast chemical wealth from the trash found in the ocean as well as energy from the tides and waves which will be substantial in many places. Unlike a river, in the ocean one can build out in a 2 dimensional area and always have both energy and materials that scales up with the building. Why is this relevant? Because this is the future of many coastal cities. As our climate shifts and sea levels rise, many coastal cities will be flooded. Some will be rebuilt higher up with landfill, with water pumped and managed like in Amsterdam. But many will inevitably be abandoned. This has the potential to be a environmental disaster of its own right, as the many toxic chemicals of a modern city suddenly can flow naturally out of the city.

However it's also a huge opportunity for the trash wizard to build the means of production. As the refuse of a dead city first starts to float freely, if fractal reactors and rumbles of robots etc move in fast enough, the entire

mineral wealth of the city can be reclaimed into the new system. Vast, scalable, production of fresh water will enable a huge canopy of vegetation to be grown above the site, using the buildings as a lattice for upward growth to create a green paradise where humans will move from place to place via skylines of various kinds, some manual and some powered by electricity or wind or tide, as well as boats of various kinds. Storms and floods should be able to be captured in terms of both energy and materials, building up huge amounts of pumped-uphill water as well as hydrogen and oxygen. In some cases it will make sense to run the reactor as the storm hits to use very high power levels temporarily to complete a large industrial task quickly with the surge in available energy.

I want to make one more point about reactor chambers in the fractal thermoplastic system. It should be possible to change the shape in situ using the various assembler robots that can carry heated reshaping tools around. It's probably easiest to do this in either air or vacuum or some inert gas, but that can always be done because vacuum and gas pumps are ubiquitous in the system. I think we also need ball valves that are driven by the magnetic motors. But if you want to do an edit, you can always use fluids to move your robots into place, move them into a fixed position, evacuate the chambers, run flown water through a neighboring location, generate power off that, create heat and motion and use the robots to use melt tools to weld, cut and add plastic to

make new shapes, motors and tools.

Three dimensional mater that is made from pure trash and ambient energy which has the power to edit itself. That is what this technology is pointing toward and I'm not seeing anything that stops it from happening. Unlike the Drexler/Merkle model of nanotechnology, this fractal approach does not start out nano. It will be useful immediately, and will continue to be useful(indeed revolutionary) even if the nanotechnology never works.

One more point I want to make is that this technology allows for all sorts of scalable bio-reactors to be built, so that all the advances of biotechnology can be leveraged into our free infrastructure. Drugs and other very useful chemicals can now be synthesized by genetically brewing with genetically modified organisms in the same way that beer is brewed. The ability to scalably manipulate liquids should allow for both the development and deployment of genetically modified organisms to brew useful chemicals. The ability to make drugs and vital nutritional supplements in this factory is critical, and again, is a technology that on its own is worth developing even if the whole rest of this plan didn't work. Given the fractal nature of our technology and the fact that it's immersed in water, organisms of all kinds can flow in and out of it, and be used for many purposes. A symbiotic relationship can and in fact must be developed between the smart matter technology and the surrounding ecosystem. Looking just at the flow of atoms, there are lots of atoms that the human

body could use to live in ocean water. Could a system like this produce a food of some kind just from flowing seawater? Maybe. With enough energy and time(both of which a patient society has plenty of) it might be possible to live 100% off the ocean.

Obviously human and other animal waste must also be processed in this fractal reactor system. Again this is a source of incredibly useful atoms. Just the methane that leaks off from solid waste is like gold for early work on the nano assemblers since it can be used to make 3d carbon nanotechnology electronics and described above. A living system should be able to digest waste much faster and more safely than the current systems where the only living thing is the one target organism that does the digesting. And of course the reclamation of chemical wealth in the form of drugs and minerals will also be of huge monetary value in the old economy quickly, creating a ready source of central bank debt wealth for the community who lives off the Reactor in the sea cities.

another blog post:

In reference to the previous post, on the fractal factory, I have been thinking more about the materials to use. I have been thinking about silicones for everything. But why? The basic principles in the previous post will work best with some type of thermoplastic, because that can be done easily with the free metal etching tool to make

moulds. heat, pressure, and a scanned high voltage welding tool can make layers from any of these types of material. A scanned heated head could also just make shapes, and of course there are 3d printing techniques.

Here is a list of some thermoplastics:

https://en.wikipedia.org/wiki/Thermoplastic

PLA, nylon, ABS, PMMA, HDPE, LDPE, and even teflon can all be used!

Also, the correct way to fabricate arbitrary 3d objects from many layers of thermoplastic is as follows. First, metal parts are made by a combination of machining, 3d printing, and laser cutting. These could also be chiseled manually with robotic vibrating parts. High mechanical impedance vibrating tools with cutting steel and diamond cutting tools chipping like a beaver's teeth, being moved around with scanned x y and z motion could cut arbitrary curved surfaces into metal.

All these various metal tools can get picked up by robotic arms and moved around and pushed into a target material, where the metal tools are heated to the correct temperature to reform the plastic. This allows tools to fall over a range of size. The same infrastructure can be used to deploy a several cm tool to cut a several cm channel in a big block of plastic, and then micron scale tools also press patterns into other smaller locations. This scaling of tools means that the fractal nature of the finished product is represented in the fabrication method.

3 dimensional mechanical thermoplastic lithography. Robots must be built which can carry out tasks with heated tools in various locations and scales.

The task to start fabrication becomes clear. To start off, metal parts are salvaged of various shapes and sizes, heater wire is wrapped around them with thermometers and temperature regulation, put it on the end of a stick of some kind, and impressions are made in different thermoplastic trash from cars and similar household junk.

Going back to the various motor designs, it should be possible to design the lithography tool set for making the bits out of various thermoplastics to get all the basic motor types to work. The path to making all these things work keeps getting clearer. With fluid transistors that can be fabricated with channels in plastics, simple logic gates can be made, as well as various types of control and amplification. With robots that deploy all shapes and sizes of thermal press tools, it should be possible to make arbitrary 3d fractal channel structures. This means we have transistors, motors, and pumps. With the high voltage generator technology working it should be possible to build it out of the fractal trash foam. Wires can be pulled through channels by rolling robots of all sizes, and they can go into the liquids to connect them. Wires separated by a small fluid chamber can make a high current transistor.

So the elements that are coming together in this vision are: Rumbles of robots can rip a car apart and make

assemblers, motors, processors, energy storage devices, high voltage generators, high current generators, pumps, compressors, and finally more robots. Plasma and chemicals being pumped and mixed in the plumbing allows for arbitrary synthesis of needed chemicals, machines, tools, and electronics.

Just the fractal robotic fabrication of thermoplastics found in trash is worth pursuing as an isolated technology. Add that to motors! Chemistry! CVD! wow! If this works based on even just using piles of trash and heater wires with sticks used by hand, it can be used as a demo for getting funding and doing useful fluidics.

and another:

One of the layers in the trash wizard technology is microfluidic channels that can move ionized gasses around. The implications of this should be examined. Ionized gasses are an essential tool in modern micro fabrication. With plasma plumbing integrated into everything, all the tools of standard microfab are also integrated. Thus it could be possible with micro sized plumbing and materials moving vibrational motors and pumps to fabricate electronic components, move them around, physically reassemble them, and break them down and reform them into other devices.

This can be a path to scalable synthesis of nano devices. Carbon nanostructures could be built and also

positioned by flowing gasses that are used for CVD synthesis through a channel that then defines the position of the structure once it's fabricate. Perhaps use of a standard CVD nanotube recipe where the catalytic particles are positioned using the particle movement tools described above, and then where more vibrational motors built into the channel are used to create junctions of various kinds to create arbitrary nonlinear circuits.

In order for all of this to work, we first need to have a scalable fabrication system for making micro fluidic channel circuits with pumps built in that can work for liquids, gasses, and tiny solids. I believe that a great starting material for this is PDMS. Unlike some other silicone choices that could be used for the fabrication, PDMS flows with time, temperature, and pressure. A scanned probe that deforms metal could be used to get a very high resolution shaped surface. This can then press a sheet of PDMS up against a flat metal plate, and with applied heat and some time a perfect copy of the metal should be made in the PDMS. This could be done to make a sequence of layers, which can then be stacked and pressed with moderate heat and time to join them without destroying the shape of each layer too much. Many layers can be added up to make a 3d network of channels. Some channels will have conducting fluids in them that can control the potential of various high voltages. High voltages are used, with feedback, to drive various floppy and also springy bits of silicone. These flaps, fins, spines, rods, pushers,

and membranes will act to move fluids, solids, and gasses around the network.

With the ability to move anything to anywhere in the 3d network of silicone, we can connect the whole cube to various input gasses and liquids to do chemical synthesis. This can also involve various types of chemical and physical vapor deposition on solids that are moved around, connected to high voltages, plasmas, etc. So arbitrary nonlinear circuits should be able to be built into the superstructure using a variety of technologies, which grow and shift over time(while keeping the PDMS matrix unchanged). This is very powerful, and justifies a potentially laborious and slow build up of the 3d silicone matrix. If one fabrication run can yield many generations of technology, it can afford to be slow.

Perhaps the first practical step is to build the high voltage generator that is part of trash wizardry. If we had high voltage, we could start playing with electrostatic motors and also would have a source of high voltage for trying to do scanned probe nano machining of metal surfaces. The way this generator might work is a mechanical oscillator will be driven by the standard philosophy engine magnet/coil driver, and will have appropriate metal and insulating pointy and not pointy bits that move charge from ground to some isolated electrode. Experiments with these types of oscillators could begin at any time, and need almost no funding, just time to work on them. With high voltage working, motors are

needed, as well as welding tips. Then scanned probe weld fabricators are made which are driven by simple electrostatic motors and can make molds for PDMS. From here, a system is built up for making arbitrary networks, then chemical and physical synthesis is built up.

Another important point about this whole technology system is that it should be fractal scalable. That is to say, there can be channels and pumps and switches and so on that are as big as meters across in some massive factory block down to 10's of cm, cm, mm, microns, and finally down to just a few nanometers. With motors that also scale all the way up to huge movers of many kg solid objects using coils and magnets down to electrostatic drivers that move plasmas around at the 10 nm scale to fabricate new nano materials, it should be possible to take in raw trash, rip it apart fractally, move destructor robots around as needed to keep it all apart and sorting it, and at the end the scale is nanometers both of the input and of the output, which are nanoscale electronic materials. These materials can be moved around on other "sides" from the inputs, scaling back up as needed to create arbitrary technology with nano structured material.

Can this all be built up from cars? I believe so, as long as some rubber can be found in cars that can work for the synthesis of the infrastructure. That probably won't be PDMS, but I believe tire rubber can be made to work with some experimentation. Fart gas from various animals and hydrogen and oxygen from electrolysis can

make a fair number of initial processes to start building up technology with. This may be the future of domestic cattle: as a source of methane to use as a process gas for fabricating carbon nano electronics. One can imagine a giant dome tent which channels the methane away from some cows and pumps it into the nano assembly. Rotting turds can also be used to source methane, which can be huge piles of accumulated dog poo in urban areas.

I'm suddenly contemplating how the many elements should communicate. I think high voltages turned on and off could be used to create electric dipole sources that can transmit at low frequencies and speeds very easily. For very low data rates, as a constant baseline, all the elements of the trash wizardry could communicate using high voltage oscillators controlled by high voltage liquid transistors.

Also note that it should be possible to quickly do science to investigate new ways of doing things. For instance liquid transistors of many different liquids should be able to be very rapidly investigated and instantly deployed after discovery.

It appears that it should be possible to create a totally scalable nanotechnology system that can break down old cars and create arbitrary new nano electronic and mechanical materials, which can create still more factories, made from the same materials which absorb large and larger numbers of cars, etc, creating exponential consumption of cars until there are no more cars.

all the stuff about the evils of the microprocessor ideology goes here, the white supremacy ideology of William Shockley and how that is reflected in the bad decisions made in developing the modern microchip. evils of clocks, connection to number worship and monotheism, sparse desert of the processor, evil separations between matter and information and energy

Chapter 8

Magic Tales and Magic Lore

Magic Tales and Magic Lore

I'm changing the name of the post capitalist system from "value circles" to something closer to "magic stories". "Value" is a problematic word since it sounds too much like an equivalent of the capitalist economic system. I think it invites too many annoying capitalism questions, and points the wrong way. And "circles" was maybe a bit of a nonsense word in the way I was using it. What the hell does that even mean? So I'm dropping both words.

One possibility I've been kicking around is "narrative", but that sounds too impersonal, and too technical. I think "magic" sends the right message since it is so

clearly a turnoff word to engineers. One thing that is clearly emerging here is that engineering as a discipline and engineers as a culture are my enemy here. They are an important part of the immune system of the Capitalist Monster that we are all parts of. It is no accident that engineers like to tear down everything anyone says all the time, being among the worst "mansplainer's" on the planet. This is because that's where the rubber meets the road for capitalism protecting its interests. The asshole male engineer who always tells you youre wrong and nothing will work is really capitalism's immune system, and in that context their behavior makes perfect sense.

Possibly "tale" is better than stories. "Magic Tales" could also then be abbreviated to "tales", which inevitably it would be. After all, when one says "tale" instead of "story", does that not tend to imply Magic? I think it does. Maybe where this should all end up with is "tale".

TALE: this is really remarkably easy to understand, and removes the hard anti engineer bias of "magic" with something more flexible. Every thing has a tale, every person has a tale, they are all woven together. Perhaps Lore should also be used, and there is a lore data channel and a tale data channel. Lore is how to build a thing, where to get more, technological data. Tales are the story this specific thing.

Lore and Tales shall replace economics, and this becomes easy to understand and explain without getting mired in pointless discussions about capitalism. Because

telling stories and lore has always existed outside of capitalism, and can co-exist from the beginning. I'm pretty sure HTML5 is the format, at least for now.

This is part of how Trash Magic can drive wedges into global capitalist culture: we inhabit the strange corners of the current capitalist regime where property-based values have not totally extinguished all goodness. These include in the water, where property law is more flexible, and in folklore as opposed to capitalist media, where IP has not taken over the culture and suppressed creativity.

Note: I'm increasingly thinking that both the tale and lore should be mostly oral. There will be graphical constructions to show how to do stuff, but I think the combination of oral and graphical might be superior to the written word for this, because I want the doing of things to spread, rather than the empty talk. You have to be face to face to really teach someone this stuff, so why not keep it offline with exchanged files not on a techfuck server? It won't slow down transmission of real stuff so why not? It will slow down the spread of people talking about our ideas but doing nothing, but that's a good thing. I want 100% participation: you either walk away or you actively participate. Reading blogs and even doing instructibles in your basement in your house is not that. Those "makers" are of no use to this movement except as a source of some materials and instructions in our early days. Images and oral transmission is something I can actually do. And this book. Fuck Github.

Currency Diagrams

This will be pictures not words.

This is now how I see "the system". A circle of debt and power links all people with business and finance to be deployed as needed to support the military industrial complex. I no longer believe in the words "money" or "government". These are both fictions. There is only debt, power, and the military industrial complex. All of this exists to use fire to turn earth into debt and power and complete the cycle. Denominating that debt by numbers which have power unto themselves without the whole cycle is a unspoken State Religion adopted by all modern states and corporations.

This is what value should look like:

People do labor using industrial "waste" of the old system until it's all cycled through the new system, using ambient energy which comes originally from the sun, and the living ecosystem that is supported by and supports that cycle in circles of value. Circles can be formed large and small, and involve trust between members of the circle which is initially fixed and which has a finite lifetime. Circles can have any of many different possible rules and structures, can live for a long time or very briefly, etc. They might have as part of their interior various physical artifacts or not, or various mathematical artifacts or not.

Circles may intersect in nodes which can have their

own sets of rules. The level of complexity of the infinitely expanding system of value circles and nodes and networks has no serious theoretical limit. I imagine that the amount of data required to denote a value circle is always going to be small, even with some fairly verbose ASCII formatted text about background, stories and rules etc. Media might be needed which could take up a lot more space, but that should all be linked to from the core value circle object.

Creation of Value

Suppose I have a motor I have built, and you have need for a motor. Suppose I have built 1000 motors so I can easily spare a couple for your robot. You need a robot, I can give you a robot, so of course I give you a robot. Together, we have created value in the world in this transaction because you having a robot and me having 999 robots is much more useful than me having 1000 robots and you having zero robots. MUCH more!

Right now we have two choices: we can just call it a gift, hand you the robot, and I can feel like a nice guy. Or I can demand some "money" for it, after which we say I "sold" the robot to you. I put scare quotes around these words, as I often do, to denote that I'm about to reject the assumptions of these terms.

When people say "money" they mean debt from the Federal reserve bank, or some other central bank. That

debt has value because it is backed by the military might of the United States, which accepts that debt in its collection of taxes. But this is fucked. Why should we need debt from some military backed bank in order to do this clearly positive transaction? Surely just doing this adds value to society and we should be able to denote that without federal reserve debt. But there is not necessarily any motivation for anyone to make that possible.

So what is the alternative? It seems that the most common alternative is the Marx-influenced concept of the time dollar. A local currency can be created based on hours of labor which can be exchanged through a community without any government involvement, taxes, or any banks. But that is of no help for our robot transaction. My robots were built by robots and took no labor. When you get the robot, it will do labor so you don't have to. By carrying out a transaction that saves labor, we're decreasing the value available in the system according to Marxian labor theory of value. Anything that makes life easier creates deflation in a labor based currency, which users of federal reserve debt can attest to the horror of.

I propose that a usable way to communicate value outside of bank debt will involve the ability of people carrying out a transaction to simply create a marker of the value they mutually created. I also propose that fancy math will not be the basis of this. Especially fancy math backed by faith in libertarian neck beard fucks(you know what currency I'm talking about). It will be based on

trust. Trust of the people involved in the transaction, which moves like a bubble through the untrusted mass of society.

I propose that one way to do this is for a transaction to be a chapter in a story, and that that story caries the value. So it works like this: I give you a robot. We write a very short story about this, why we did it why it was a good idea, why the robot is cool, etc. Short, to the point, with some details. Now, I can take this story down to the coffee shop and say "hey, man, can I have some coffee, I gave someone a robot today!" They say "yeah, you can have coffee here for the next week or so for a robot, sure. That's the next chapter of the story. They pass that along to their milk supplier, who adds another chapter and sends it to the fence post company, who takes the longer story to an affiliate coop out in the country who is part of our network, who delivers a much more substantial wood processing robot machine. A real monster. And so on.

It's not a fully formed system, but I don't think a good system ever really will be. It's worth a try, better than nothing, better than federal reserve debt.

More on Value Circles

Another element of the value circle currency concepts is myths. Myths, legends, narratives, call it what you

want. One way to create shared trust between members of a value circle is to have shared culture, or folklore.

Do people believe these to be actually true? Maybe. Maybe it doesn't matter. My view is that existing money already has a weird religious belief built in of the most dangerous possible kind: that which people don't even acknowledge IS a belief. The entire world view created by the monetary system where everyone has to exchange central bank debt is not related to physical, social, or biological reality. It's a artificial creation which harms most of the people who without having a choice or even understanding that they made the choice are forced to live their lives by it.

One way to combat what is essentially a very conservative religion is to form a belief system outside it, making the transition from the money belief system to a new one more explicit than just "losing faith" in money which does not force the concept of money to be treated as a religion.

What would be an example? I think initially they would tend to fall into two categories: fan fiction and religion. One of the easiest ways to build a mythology of a value circle is to do something like base things off of Star Wars or Supernatural or something. It helps when people know a thing well enough to have a shared reference easily right from the start. For people who already have some sort of religion, building a trust network based on that both formally and informally is an obvious way to

get started. Of course other values would be shared by a value circle, including technically specific elements like "meters of 24 AWG copper magnet wire", but on top of the specific parts, I believe having something less quantitative and more personal is useful. More on this later, this ongoing stack of aspects to the Value Circle.

On Money and Additive Value

I hate money, and also love it, and that is typical of people in our civilization. I've thought a lot about all that over the last year of my total personal disillusionment with capitalism. I'm definitely against most of how our "economy" works, and definitely in favor of something else, but it's hard to even know where to start with all that. One habit I've acquired over the last few months of reading and thinking about anti-capitalism is replacing the word "money" in my mind with "federal reserve debt". That's literally what it is, and constantly reminding myself of that helps me to think clearly about the world around me and what to do about it.

One thing that I hate about money that I want to raise here is that it is dissipative. When a transaction occurs, one party transfers their federal reserve debt to another in exchange for some more real good or service. That transfer has all kinds of losses in it. First of all, in the money system the most value that can possibly exist after the transaction is the amount you started with.

Until another party is brought in, in a single transaction, the amount of federal reserve debt always goes down, just as the amount of entropy always goes up in chemistry.

Looking at a system like this it's clear that the best way to accumulate federal reserve debt is to be the dissipation. One way to do this is literally to take something from the transaction, which is what paypal and banks and credit cards and the rest of the finance industry do. Another is to make money off taxes, as the military industrial complex does. And a third is to be a middle man in the information channel from seller to buyer, by being in the advertising/marketing industry. And indeed I argue that these three types of accumulation are the main power lines in our society: military, finance and marketing. Plenty of power and wealth accumulators are all three or some combination, but I argue that most power in our society is based on these three pillars because they are the optimal means to accumulate federal reserve debt. Everything else loses to these dissipations and eventually feeds someone in one of these three pillars more than your little project possibly ever can accumulate.

It is not so much my goal here to attack the concept of central bank debt, taxes, etc. as to think about how to get outside this to add and exchange value without that system. What I argue is that a transaction should add a note of value to both sides, not just one, and that it should require no value on a balance sheet before the transaction. This second part is extremely critical. One

of the crippling problems of our current system is that it prevents anyone from being self sufficient, ever. If some group wants to exchange goods and services in a closed economy they need to first get federal reserve debt from the outside in order to even have units of currency with which to work. Add dissipation to that, and eventually they'll always be more and more dependent over time on the outside world, and be forced to participate in global capitalism. A system that addresses these problems must allow parties to agree to do a thing, do it, and create from nothing the value that can be further passed along to the rest of society. Another critical flaw in the money system is the negative value of work. We assume that in any work transaction there is a winner and a loser. E.g. at a gym everyone has to either pay or get paid, it's assumed that the coaches are losing something and the athletes are gaining, so they are on opposite sides of a neutral or net-negative(with rent and taxes etc) transaction. But surely the coaches also gain? Are they not also athletes? And the athletes are working just as hard, why is their work somehow "opposite"?

All this is cleared up by the additive currency concept. Here a transaction creates a value pair, with half taken by each party. Thus when a personal trainer meets with an athlete, they each walk away with a unit of value equal to one times the value of that transaction. Let's now go back to my motor factory supply chain. An urban scavenger rolls up on their bike with a big bin of

copper wire, and we each record that that was of value and changed hands. They then take that value token to the local coffee shop who pours them coffee and both sides get the coffee transaction token. The coffee shop buys a coffee grinding machine using one of our motors from one of our customer factories, more tokens are generated on both sides. The coffee shop takes this new hoard of tokens and pays their workers, and this payment also generates value on both sides, further accumulating the wealth of the coffee shop who is a major pillar in all this. The grinder factory trades with us for motors in bulk, and some bulk material transaction value is again created on both sides of the sheet.

There is a strong analogy between this system and the so-called h-index used in academia. The h index is designed to create a measure of the success of an academic career based on the combination of two factors: how many times has someone published and how much are those publications cited. The idea is to avoid valuing either the one paper that gets 1000 citations or the author who publishes 100 papers a year none of which are ever read. Authors who both publish often and get frequently cited are, on average, going to be the biggest contributors to value in the field. For better or worse, h-index ends up having real value that can get turned into federal reserve debt by having an impact on hiring and promotions of academics. It's not a perfect system by any means and is widely abused by departments but

I think it's an interesting proof of principle that this idea can be useful.

A missing part of all this is a proposed implementation strategy. How should the value be accounted for? I could think of a lot of ways to do it but I want to make the point that I think this is much less important and difficult than a lot of techno nerds want you to believe. Any store of value, whether it's paypal, cash, or credit card debt is basically based on trust. Sure, there are anti-counterfeiting measures on bills and encryption on online transactions. But for the most part these systems work because most people can be trusted most of the time. If everyone really were out to steal and cheat, encryption would be nowhere near enough to save it, and it would collapse instantly. All this works because the VAST majority of people would rather do something useful than go into the illegal bill printing business or credit card theft. One way I think it could be done is with an archive of stories. Some kind of shared electronic narrative that includes all the transactions in the network. This is not great for doing illegal shit or avoiding government surveillance, and that is a problem in some ways. But not in the long run because it forces people to push back against the government controls a lot harder and faster and also because that stuff can always still happen with federal reserve debt, alternate and more anonymous systems, etc. Clearly there will be others for whom this doesn't work. But I believe that a story- database-based system of value

can work for some people. And if it works for anyone it's instantly extremely powerful because it will grow exponentially and naturally find the people who can benefit from it most. Is it taxable? Probably not. If we do things "for free" meaning no federal reserve debt is exchanged at all, what is there to tax? Surely not vast, unencrypted databases of anecdotes and poems describing the actions of millions of people.

And it's not even really necessarily a threat to the government tax system, I think. Part of how our system is as broken as it is is how differently it serves those who control the pillars of power from the rest of us. The fact is that the capitalist overlords, governments, military machines etc. don't really need the vast majority of us to exist. Our demands for food, medical care, housing etc. are mostly an inconvenience to them. An economy like this might take what looks like potential tax revenue out of the system, but it also takes an incredibly vast load of social welfare spending off of the existing system, since that kind of value is so much better created in the additive value system. One more point is that I don't consider bitcoin to be in any way relevant to fixing the money system. With any form of currency, you have to ask "who do I trust when I place trust in this?" I have lots of criticisms of the central banks, and the federal reserve in particular. But given the choice between central bankers and some neck beard fedora software montherfuckers, I'll take the central bankers any day of the week.

Because the demographic in charge of bitcoin is, in my view, the single least trustworthy group that exists in our society. Also, building deflation into a currency is so bizarrely pathological it's not even worth looking at. Bitcoin isn't money, neck beards are not revolutionaries, it's time to move on.

So where do we start? I think I want to build a supply chain out of trash, and then just try the database of stories method and see what happens. Having a supply chain that is clearly of value will give me the leverage to start a thing like this. So probably another year or two are required, and hopefully by then I'll be more comfortable with python and will be able to build a prototype software system to start this off.

Free Feed of the Value Circles

People love their feeds. Facebook, Twitter, Yammer, news feeds, tumblr feeds, text message feeds, push notification feeds. It has proven to be a very widely liked format for a person to see the passage of time of a community of people. Value circles should include this feed concept. Working on your stuff will add media content from your device which gets added to the main value circle database and then fed into various users' feeds based on their filter choices. I think if you are not trying to make money that this whole thing can be much simpler than the existing software and that Facebook etc can

be replaced. However, it's also possible that the best first implementation of this will be to do it in a existing commercial system like Facebook. This is obviously dangerous. Dealing with companies like that can have legal problems, control problems, and limitations on what you can do practically. It's not ideal, but it's something to consider. And the free feed that circulates and shares data to a web browser that can be loaded on the pi zero tablets of the trash wizards is a project that should be worked on immediately. Probably tools already exist that can be adapted for this task. This is worth some detail in the first book, it's not physics, it's code and that's faster to deploy.

Courier system

I need a courier system to facilitate movement of goods as well as skills without shipping costs

Also value trees

Is the circle the best geometrical metaphor? Sometimes. But I should generalize the concept of geometric metaphors to include the spiral, the pentagram, the tree, the fractal, the sphere, the torus etc. etc. trees have roots and leaves and branches and a trunk and sap and sun and soil and water.

Trash Wizard Interaction with Capitalist Economics

We all have to live somehow, and most of us can't just sink beneath the waves and escape capitalism overnight. We need money to pay rent to live in a city where our loved ones are, to pay for medicine, get around on capitalist transit etc. How do we do this ethically without just selling out?

Here are the rules for Trash Wizard capitalist interactions:

1. Try not to buy raw materials and other peoples labor, salvage trash and rely on mutual aid for free, and build your own stuff
2. To make money, selling labor is best, then selling stuff made from trash, always try to avoid labor and materials arbitrage: don't buy stuff then sell it don't pay people then re-sell their labor.

3. Do not sell misery, try to only work on things that are fun, while they stay fun, each product or service should be an ADVENTURE.

We create. As long as our fed debt money comes from our labor and trash, we will always have a net gain of capitalist currency into our system, making hte sign of the dderviavie right. sell one off art pieces for high prices. All my pieces should be unique.

Specifically The Post Capitalist Sex Industry

Let's imagine a sex industry, with the word industry used, and inside the capitalist system but without actual capitalism. What do I mean by that? I mean that people who work make money but that they neither work for a capitalist nor function in that role themselves. By "capitalist" I mean someone who pays one price for something and then sells it at another price, whether that is wage labor or materials or outsourced services. Usually they use some economy of scale to allow themselves a monopoly enforced by the usual forces of armed capital. Exchanging things of value for currency is not capitalism in that sense, as long as you don't have to spend money for it.

I will now sketch out a "business model" for an anti capitalist sex industry collective using Trash Magic.

First of all, how do you want work in this system to work? Really what you want is to get paid about $2000 for each sex event, to do it with a bunch of your hot porn star friends who are into cool stuff and live in your cool neighborhood, and to make art together and also build something that useful, combining art and beauty.

So let's say that the goal here is to have about 6 people get together for a queer techno art orgy and each make about 2 grand. That means you need to make a total of about 12 grand. And you want to build a set of artifacts which you sell for about 50 to 100 bucks, which a lot of people will shell out for if they dig what

you're doing. That means you need to make, sell, and ship about 300 units.

So this orgy has to have the right set of robots and other machines so that 6 people can make 300 units of an art-tech artifact in some reasonable time. Suppose this whole thing takes a relaxed afternoon to do, with all your stuff already set up in your Trash Magic Coven Space. if we divide the number of units by the number of people it's 50 units per person for the whole event. If each person has about 2 hours of full participation in them before they get bored or tired, that's about 25 units per person per hour, or one unit every couple minutes for each person. That's pretty efficient! Very doable with automation, but really quite efficient and will require serious process optimization, which the orgy process can help make happen.

Ok, so suppose that after your leisurely drugs/industrial metal/manufacturing/art orgy you have made, and I'm going to boost the numbers here, 500 units. You put those in an inventory file, which you only give to people you put on a vetted customer list. Each unit contains physical media with video and other data of the orgy for pornographic purposes, and is a fully functional Trash Magic Stick. The inventory system starts from scratch with each orgy, where each customer has a one time customer ID number randomly generated and never used again. Customer and performer alike then line up times and places in the database to meet usually in pub-

lic places, generally with several customers for one performer and place, with performers always traveling in pairs for safety to exchange the physical "art piece" for 50-100 dollars cash. Thus each transaction is simply money for art, in small cash amounts(generally exempt from sales tax). All transactions will be local, and performers will courier the inventory by bike around town. The number of customers is about 300-500 so for 6 performers each one can plan on about 3 distribution events each with about 20 customers. So it's a second afternoon, on top of the first, and with a good number of people for the events, easily each person could make 2-5k for a couple days of work. If you did that about every two weeks, you could make 50-100k/year, enough to live a comfortable life where you spend 80% of your days doing other free art and science and the remaining 20% having orgies with your hot art/tech friends.

Many of us will end up doing serious R&D during that other 80% of the time, enabling our factory to make more and more advanced stuff. After a few years of R&D I could imagine the customer getting a portable medical imaging machine and some synthetic insulin with legit quality control for their 50 bucks cash.

But what about the current clients, the horny old men with tons of cash, the sexually disappointed owners of capital? They have to pony up much more than cash if they expect to get what they want. They want some kind of elaborate pro domme fantasy? Ok, sure, but they're

not going to hand over a stack of federal reserve notes, they're going to give you 80 tonnes of shipping space on their next freighter out of hong kong and 10 tons of rare earth magnets for your motor production. If they want to use their position as controllers of the means of production to get sex from younger, more attractive, and less broken people, that's all fine but they're going to actually hand over those means of production not some bank debt funny money.

Examples of what clients might hand over would be vast quantities of raw metal, permission to work on private land without rent, and a lot of long haul transport. Given that some captains of industry actually know something about industry, this might even not be that bad for performers, especially if people were well matched up in interests.

Also note that all this will be art. As fast as we'll be moving on the assembly line to both have sex and guide the rumbles of robots, we'll all also be working on the artistic process of shaping how the products actually look, as well as putting on a performance that will be in the final media.

In the beginning, obviously my fantasies of MRI machines and nano drugs is not realistic, so what will we actually make first? The Trash Magic Stick will be the first product. This is a simple artifact about the size of a large walking stick, which can do many tasks that require an electric motor. It can be modified by the user to have

a powerful sex toy, a mobile robot, a simple manipulator for 3d fabrication, a water pump, a evaporative cooling unit, and several other useful machines. It runs off of ambient energy as detailed in my book, usually flowing water on site.

Yes, that's another thing, the physical site location. Ideally orgies will take place in an amphibious environment of floating trash boats in really nice weather, so that there is water power readily available both to generate electric current for electronics and to do work and to source water and other chemicals into the various industrial products. So the Spring Orgy will be huge in this system. From the thaw of the creeks through summer might just be one continuous orgy, followed by just swimming and writing all summer and sleeping all fall. Again, if we have the machines and robots we need, this is possible RIGHT NOW, under capitalism, living in a nice fancy apartment in a big city and drinking expensive coffee.

Oh, and how do we do that without getting the government coming after us for tax evasion? By paying our taxes. Part of the infrastructure that should exist here is a automatic LLC formation and dissolution as needed for series of orgy/fabrication events. A company bank account will be formed, money moved into it, taken out for taxes and distributed as dividends to all the equal coowners, then dissolved. So we'll actually all be paying a very high tax rate. But who cares? We won't be putting

any money in, hiring anyone or working for anyone.

And this can also be scaled up quite a bit as high end pro doms fully deploy their network of clients to start getting their hands on larger quantities of raw metal and other critical process materials. We want to avoid any materials getting mined on our behalf, because that will make this technology non-free. However, if material is diverted *out* of the capitalist system in exchange for pro dom and other sex services that is a net positive.

Lastly I want to consider a use case of this model that's scaled up a bit, to say 100 people. This is something that could be done on a trash flotilla surrounded by yachts in the waters outside LA during a sex industry convention. 100 people come together and make, now with considerable economies of scale and sophistication, 500 units each over a week of work, with insane epic orgies of every possible variety. So that's 50,000 units. And at this point each thing is really powerful, can do significant high tech shit the capitalists can't do, like universal medical imaging. So the performers sell them for 100 dollars each, easily, making a total of 5 million dollars revenue for the project(and gross = net because we spend zero money). If you divide 5 million dollars by 100 people, you get $50,000 per person, enough to live a decent life on for the whole year without any other work, even after paying a high tax rate(which we should not have to do since this will be capital gains if we have a decent accountant).

Does that sounds like unreasonably high production rates? I don't think so. Current manufacturing technology already has huge economies of scale. If those same scale economies are used with the same physical basis of our technology but where everything is made from trash during orgies, and we keep the value, this is really a pretty modest production rate. With that many people involved, we'll have access to a ton of raw materials, land, computer infrastructure, machines of various kinds etc. And is the number of 50,000 customers for this scenario realistic? I think it is. With mass communication via twitter and the like, it should be possible to very easily and with no money spent to have the more marketing oriented performers connect up with that many people in a large metro area like LA or NYC, and then for each performer to personally distribute 500 units in sets of 50 10 times by bike around town. Serious work, but doable, and in just a few days if all the infrastructure is in place.

With larger economies of scale and more high tech products, it will be possible to have the products sell for quite a bit more, as well. Something very high tech that costs many 10's of thousands of dollars(I really want to build a fucking MRI machine,really want to) might be built this way, making it still easy to sell the thing for 500 dollars in this model, making the take home for each performer more like $250,000, meaning they only have to do an epic sex manufacturing art science orgy like every

few years if they want.

So this is how I propose the sex industry should work within capitalism. It is a system where all performers are paid the same, make $50-250k/year for working a few weeks a year maximum, only ever have sex with their hot porn star friends, and don't have to worry about cops or the IRS because no laws are being broken and taxes are being paid. Legally, all performers are professional artists, part of a series of art-selling LLCs selling their own work built from trash.

How the fuck do we actually do this, you ask? That's my job: to build the robots and write the instructions so that you can do it just by watching some tutorial videos and downloading a bunch of free instruction files. Give me another couple years and I think I can get this working, but I think for very small numbers of units and people I can get something working by fall of this year: making sex toys I mostly already know how to make, which just need a bit of work. Art, though, all art. Oh, yeah and free MRIs and the most powerful vibrators ever built, running on off-grid power. Boom!

Also note that all this is Trash Magic. So these are magic witch orgies, using all sorts of Trash Witchery, with associated Magic rituals involving the process of assimilating trash into the world of magic.

Chapter 9

The Great Junk Car Feed

To the beat of the drum:

ROBOTS that turn junk cars into robots
that turn junk cars into ROBOTS
that turn junk cars into ROBOTS
that turn junk cars into ROBOTS
that turn junk cars into ROBOTS
that turn junk cars into ROBOTS

Cars are Death, Death to Cars

Cars are the enemy of humanity. Every year in the US cars kill over 40,000 people, and maim countless more, similar to the *total* carnage of the entire Vietnam war

which lasted many years. Globally, the death toll is well over 1 million, or 10 million in a decade. 10 million dead.

And that is just the beginning. Cars are central to the industrial system which has crushed our humanity. A huge amount of our oil based economy is used by the car system, adding to climate change massively, as well as bad urban air which kills millions worldwide. Cars create a society in which anyone who cannot drive is disenfranchised, punishing anyone without perfect health and significant funds as well as the willingness to actively destroy the world and possibly kill living things just to get through their day. Cars have filled up the USA with enough pavement to provide solar power to the entire nation(no small feat given our absurd energy consumption now). Runoff of oil and other toxic chemicals leaks from cars into every water system in the world, poisoning every possible ecosystem.

The companies that produce cars are some of the most evil on the planet. Several of the major global brands, including all the German ones, have actively participated in genocide, an act for which they have never been properly brought to justice. The endless stream of minerals required to feed the input end of the planned obsolescence conveyor belt also destroys the world in the ways that mining always does, with its usual disproportional impact on indigenous people around the world and on many other marginalized populations.

In America and many other countries, car companies

actively work to undermine democracy and civil society, campaigning to make sure society is built around the profits of their companies rather than basic principles of free movement of people. The ability to move from one place to another within a city for free should be a basic part of any social contract that people would actually consent to. Car companies have built a society where there is no universal social contract in regards to mobility: all mobility is held hostage, under threat of violence, by a group of psychopaths(all car makers) who force all transport to make them money. Even "public" transit is always based on giant machines made by the same monsters, and is deliberately priced high enough to make sure the poor pay at least as much per mile for getting around as those who have the money to buy into the car system. Every time there is an economic downturn, the corporate backed local government will use that as an excuse to further crush the lives of the poor, raising fares and cutting services at the very time those without resources are likely to be the most desperate. Again, this shows the fact that there simply is no social contract in the modern industrial city which all citizens consented to. There is only the raw law of force: whoever has the most control of the industrial machines has the power of life and death over everyone else. Of course the rulers dress this up in nice language about the "rule of law", but there simply is no such thing. It's a costume raw force wears in our world.

So the car companies and their collaborators in government are enemies, and cars form an almost living enemy of humanity world wide. What should we do about this? The Trash Magic answer is always the same: first find the trash stream(which always exists under capitalism since destruction is inherent in their ways) and then find ways to organically incorporate this into something good rather than bad.

Magical Answers!

And what treasure there is in cars! Name any precious metal or special type of polymer or gas fitting or mechanical device and you can find them in a car. A single unit of the modern automobile also has numerous computers of all kinds, which can be stripped and used for integration in our electronic systems. And given the spectacular waste of the current system, cars really are free: while there is a used market for junk cars, it's clear that for society as a whole the global stream of junk cars, like other industrial waste streams, is a net liability not asset. This negative value creates a global and ongoing opportunity for us to get the parts we need from it.

Another advantage of using car parts for industry is the way in which the car standardized. There exist millions of units all over the world of certain popular car and truck models, and it can be possible to very accu-

rately duplicate a complex design which uses parts from a certain make and model because of this.

In particular, the parts of cars are great for building robots. As discussed earlier in this work, robots in the right hands can have a fantastic positive impact on the human condition. And this is really what this story is about: the robots built from cars which destroy cars. If they are easy to build, and it's easy to *teach* people to build them, they can self reproduce, creating an exponential destruction vector through all cars globally.

Robots must be designed and built and grown which first find cars, then rip them apart for scrap, then sort and catalog the parts, then reform them into more robots. These can all be different kinds of robots, possibly used separately, possibly together, made by many people with many methods. The point is they should be easy, and create positive value(unlike what the capitalists build, ever.)

End Game: End All Cars

Destroy every single car. rip out the individual atoms. Rip them apart. Smash the engines, destroy any vestige to show that they ever existed. Rip up the roads. Build structures to live and work and grow crops in. Make them all green, smash them but don't replace them with private property, this is a wedge to build more non private property space.

The end game is this: when the thing a car turns into after it ceases to be a car has greater value than even a functioning car, cars will start being consumed by our technical ecosystem even before the end of their capitalist lives. As non-capitalist ways of living expand, the companies that make cars will be increasingly starved of the consumers they need to keep building and growing their death machines. Eventually the companies will die and the existing cars will be destroyed faster than they can be made, eventually making the capitalist industrial system simply physically unable to keep making any cars. Without enough car consumption to fund the corporate government, there will no longer be military force protecting roads and they can also all be ripped up for use by humans and other living things.

Free Lives Don't Need Cars

At this point, the capitalist will whine: "but without roads and cars how will I get around?" First of all, you have to ask why you need to drive around all day in the current system. Do you really need all that? Do you need to go to an office miles away to do things no one needs done?

No. No you don't, and that's how all your errands are. Errands are unpaid labor you have to do for industrial civilization. Stop doing errands. Stop working. Build and grow what you need, then go have adventures as

needed. You should have everything you need for a good life, except adventure, within easy paddling distance of your main bathtub/bed. You travel when you want to for adventure or when you are part of a larger migration which will use larger vehicles, mostly boats and giant spider pods, for moving whole populations.

Chapter 10

Factories Everywhere and Nowhere

Slipping Between the Cracks

Where can we build? Where can we work and play and live? Between the cracks. Between the cracks of the industrial system, between the cracks of empire, between the cracks of cement and steel. Just as we seek to build from the discarded materials and energy of the old world, we seek to thrive and grow in the spaces they have cast aside.

As with materials, those spaces are incredibly rich in every possible way, when looked at outside the value system of capitalism. Often these spaces are considered off limits by the powers that be, and are supposedly private

property. However the spaces I'm thinking of are not monitored and indeed must be ignored for the system to work.

The foul waste filled waterways of suburban New Jersey are one example. Often spaces under freeway bridges are ignored and abandoned yet centrally located in a city. Abandoned factories are a fantastic place to restart industry in the places abandoned and destroyed by organized capital. The dark, unkempt corners of various parks have places where someone can vanish from sight and be centrally located with access to people and infrastructure.

In general, our first choice for location will be somewhere that has running water. This could be either a flow of fresh water or a tidal flow, but it is important both for a source of unlimited energy and for a source of materials. Deep water is useful for being able to move very large freight such as salvaged trucks or airplanes found underwater into position to work on in the production zone.

Water also serves as a source of coolness for protection against hot climates. Evaporation can be used for added cooling power using water driven pumps. plumbing which can be taken apart, moved, and put back together should purify and move the water around, making hot bath water and god drinking water, as well as building the input for the biological and chemical reactors which will process human waste.

After water and energy, concealment is probably the next priority for the "between the cracks" model. The easiest way to do this is to be very low key and work on existing land. If you can camp somewhere, and the Trash Magic industrial production is quiet and small enough, perhaps you can simply do it un-noticed wherever you happen to be. Setting up in the factories the industrial system has abandoned en masse in places like the industrial Midwest of the USA is another great concealment strategy.

Camouflage in design is also an important tool. We should be prepared to build infrastructure that does not look like infrastructure. One of the ways in which the symbology of Trash Magic can be used is in an extension of Hobo symbology which allows for cryptic marks to indicate what infrastructure exists where. Part of the art we study is building working technology which looks like the environment because it simply *is* the environment: boulders, logs, sticks, rocks, patches of seaweed, etc. Substantial infrastructure for industrial production of all kind can be designed, built, and deployed in this manner where only the initiates in our Magic will even know it's there.

Bring the Means of Production to the Action

Most communists and anarchists direct us to turn the factory into a place of political action. I propose to do the opposite: to bring the means of production to the action. Where there are protests or occupations or refugee camps or war or poverty, Trash Magic can shine a light in the darkness.

One of the great tragedies of every radical commune project is when the forces of Law and Order inevitably come in and destroy everything. In the case of Occupy, there were libraries, various other services, first aid tents, all sorts of art and carefully built spaces, which were all deliberately destroyed by the New York Police Department in their repression. I see this as very avoidable. Rather than building static infrastructure which mirrors capitalist infrastructure, I propose that infrastructure built during various occupations and insurrections should always be dynamic and mobile. And *all* of it should be art of the kind which can be easily gifted to others, to spread what has been made.

practical considerations, examples, actually go do it and record it and put it on youtube

Production in Autonomous zones

One of our goals is to erase arbitrary lines between things that are currently separated. Just as some people have tried to erase lines between protest, occupation and party. I want to erase lines between industry and art, between protests and factories and workshops and squats. Anywhere there are people and materials there can be industry.

It's worth mentioning that I don't mean just crafts or hobbies or art in the current definitions. Part of what separates industry from those activities today is how they all scale. Art gets its value partly from a deliberate non-scalability. Crafts are almost deliberately set up to be non scalable as well, to create some kind of perverse joy in doing things slowly and with a lot of specialized skills. One speaks of a "craftsperson" as someone who has mastered some difficult special skill, and who therefore has special privileges associated with that skill.

In Marx's day there was such a thing as an industrial worker, and maybe in some places there still is. The industrial worker is part of a larger whole which uses economies of scale to change how people, energy and materials move in such a way that it will always beat out other forms of production on efficiently and "price". This has led to a historical dead end as the capitalists have carved up the global working class so effectively. And good riddance! Do we really all want to work in

some giant factory doing identical boring tasks for many hours, even if the IWW "owns" the factory and we all have free food and health care? Fuck that future. We bring the factory to the streets where the party is, inject art and culture in it, and make it able to thrive and grow fast in the current world.

Here's how it happens. Anywhere there are people, energy and materials, we just start building industrially and creating art as part of that process. We build processes and document them(this used to be called culture) which can be spread and expanded quickly, which allow any group of people with minimal skills to rapidly build an effectively infinite inventory of useful industrial products such as air conditioners, water purifiers, massagers, grinding tools, communications infrastructure, blenders, coffee machines, electric wheelchairs, soaring surveillance drones, and medicine. All these goods are immediately entered into the global decentralized database of free artifacts, which allows them to be immediately taken by courier by hand to users who absorb it instantly into society.

This totally changes the balance of power in any occupation. If instead of occupying the center of town and putting ourselves in conflict with current society we imagine a bunch of yuppies having to go down into a Sacrifice Zone to get some awesome artifact they can't get anywhere else, which they also can't pay fed debt for. There is no transfer of fed debt or "ownership", so all the normal

regulations that apply to commerce do not apply. We slip between the cracks to build up the factory, make stuff, absorb trash, improve the environment by putting in infrastructure easter eggs, and disappear. Often the people who come together to do this will simply not exist as a coherent organization before or after the industrial/art event.

The powers that be know how to protect "property" and to keep the have nots from getting it from the haves. Much of this has to do with regulating money. What they do not have experience with is free people giving away free stuff from trash and ambient energy in on and around their system. They're prepared for a broken shop window, but not a free beer fountain in the park. They're prepared for a black bloc in the middle of the town square but not a boat factory in the middle of a polluted-to-death river. They are prepared for half a dozen commercial surveillance drone sent to spy on the cops. They are not prepared for 10,000 soaring drones built from trash, soaring over the dead land of the American West looking for pollution and mapping it for future use by our industry.

And this process is within reach now!!! I still think the first industrial process is the coil winding process which is used to make more of itself. This means both a coil winding machine and the power tools needed to quickly break down electrical appliances to get the copper wire out and the infrastructure required to track down rare earth mag-

nets, as well as power tools to make lots of Skeletron and plastic parts quickly. So this means drills and grinders and saws and also heat tools for working plastic, grinding tools for taking stuff apart, and good sensors for tracking down magnets. Also free decentralized access to all the needed data. Energy must be ambient, not oil or human.

This set of tactics then informs the overall strategy and vice versa. It tells you where to occupy and for how long and with whom, at least to some extent. We need ambient energy. That means the sun, the wind, and moving water. Moving water is usually going to be the best choice because the energy density can be so high. With 1000 times the density of air, a relatively slow river can be much better than even pretty fast wind. And way more pleasant to work around. Also waves and tides can be used, as well as in some cases water that has been pumped uphill over a long time before the establishment of a industrial occupation.

We reflect the industrial occupation of today through the looking glass: rather than not building stuff in a factory we build stuff in a not-factory.

So the first choice for a site is on flowing water, with tides and waves especially helpful. Also note that natural water, even very polluted water, is also a source of many useful industrial feedstock. At minimum you have H2 and O2, but usually a vast wealth of other chemicals. So a very polluted wetland in the mouth of a river is an ideal site. With a combination of skeletron and plastic

we can build an amphibious set of shelters and transports and food and water production which add up to self sufficiency.

Then we need materials, raw materials with a clear path to an industrially produced artifact or set of artifacts and raw materials to be moved by courier to another post capitalist industry node.

metal and plastic. And wood. And stones. This can be many places. Rivers with trash in them, with littoral robots that go out and find it is easy pickings. Also any dump of car or electronics related junk by a river or lake or sea. And there are so many of these! Sacrifice Zones are often near water. And usually have unlimited trash available.

We roll in, we build and distribute, set up infrastructure easter eggs, and move on. While where there, we create a one-off unique culture for that time and place, which propagates through the physical artifacts which carry data that includes the artistic culture of that unique time and place. This also means that the phenomenon that replaces the current protest model can be more long lasting. Imagine if any of the famous protests or occupations, such as for instance the AIM occupation of Alcatraz had been run this way. You could, today, use an artifact with a piece of iron from a rebar salvaged from Alcatraz and painted by one of the occupiers there. Such an artifact could then have been used for an electromagnet in a big motor that ground coffee beans in Zuccotti

park during Occupy Wall Street, which was then incorporated into a sort of Jawa art car that roams the toxic waste deserts of Arizona, collecting minerals for another future project, all with added stories and media and art.

How different this would be! We could all be participating in various insurrections, art communes, famous science experiments, and huge parties at the same time, endlessly remixing artifacts that carry all that culture with them.

I need to find the Sacrifice Zones that exist in the coastal waters of the East coast.

Searching my memories of such places in Souther Connecticut and also looking at maps and charts of coastal DE and MD, I'm reminded that simply finding the "free" material input in such a place is non trivial. What i think I propose instead is the same courier system used to distribute artifacts is used to acquire raw materials from the trash of mainstream society.

Also, if production happens in such coast waterways but materials come from elsewhere it should be possible to disappear. A combination of counter-surveillance to always monitor the monitors and camouflage and totally mobile amphibious infrastructure should make it possible to avoid detection in un-used land indefinitely. This should be possible all over the world, anywhere there is a fractal water system. The areas around Boston, NYC, DC, the SF Bay Area and Seattle are all like this, as well as many of the great cities around the world.

Trash Pirates. Southeast Asia has marine sacrifice zones where ghost ships with slave crews fish for the grocery stores of the rich world. If a guerrilla industrial movement were to appear in this environment with vastly superior technology to the capitalists, we'll see very rapid change with no physical opposition from the nation-states. Why? Because they have built a system where they have a vested interest in these lawless zones existing. They have to either impose the rule of law on these places and lose their slave-caught industrial fish slaughter or they have to accept that our pirates can operate outside their "laws" just as readily as our capitalist enemies.

What if Somali pirates could offer legitimately better employment than the European companies the crews of the hijacked boats work for? it's hard to negotiate for "hostages" who don't want to return, and dangerous to negotiate for them if when they return they all just quit and disappear into some swamp. Let's fill in all the spaces the capitalists have chosen to neglect with new industries that combine art and culture and science and technology as one thing!

Life in the Delta

The future of humanity is in the deltas. just as the past. And it's easy. SO many cities have out of the way places an amphibious trash magic industrial culture can flour-

ish without detection. Freight transport powered by tidal energy driving electrochemical cells can be used as a universal industrial supply chain, with vast amounts of trash gathered for free from underwater salvage and swamp and wetland salvage. Distribution of goods into the capitalist economy in the heart of a city via water front parks can then easily happen, also under the radar. By under the radar, I literally mean under the actual radar, with boats of such a low profile that they are not distinguishable from wave action by radar. Fabrication will be right on the edge of water and air, with object able to be moved in and out, water to be sprayed and pumped and mixed.

The capitalists have had nanotechnology all wrong. They have been looking for a clean technology with perfect control. That's wrong. You want only fractal control, and very dirty, to in fact eliminate the concept of dirty. Dirty is a capitalist delusion. Must look beyond it. Under water, fire is also less of a hazard. H2 and O2 plumbing everywhere, as well as compressed air, fresh water, DC power, various materials which can be sent in tubes via plastic cells that get pushed along and tracked. Just the ability to make QR codes in plastic combined with floating plastic and pumps can make a amazing network demo. Also for data transmission, when you have material transmission like this, it's always trivial to send data by putting a piece of physical memory onto a boat that runs along the channel just like in the pure infor-

mation based networks of today. Thus one of the many lines we seek to erase that arbitrarily divide the world is the line between data and not data. Data is another capitalist delusion. Information is physical.

Also agriculture. If it were in stormy seas or tidal shallow water with strong currents it should be much higher density. With both the atomic feedstock of seawater and the energy content of the tides and waves, infinite amounts of fresh water, minerals, nutrients, and light(possibly from electric lights, to get 24/7 underwater agriculture), also things can be 3d with light generated electrically, water coming in from all sides, temperature control. The density of crop cultivation should go up by way more than an order of magnitude, probably at least 2 orders of magnitude. Thus a few acres of swampy wetlands in a strong tide with a good river current could sustain hundreds of people comfortably if the infrastructure is built right. And since it's all mobile and modular and can be built from trash, even if we all have to move or the State takes the stuff, infinite infinite.

In addition to deep ocean and river delta areas, this process can build up land out of the ocean where it is shallow as it often is in the tropics. Trash can be built up into reefs of industry, designed to draw energy out of and thrive in storms. Total global game changer.

Guerrilla Fairy Art

I have figured out the nature of the first phase of technology development: guerrilla faery art. I've been getting distracted by the long term goals of functionality for industrial production, but for this first volume aimed at non technical readers, it makes sense to focus on technology which will make sense and be obviously worth spreading: guerrilla faery art. What is this? Art outside the capitalist system, installed without permission, built from trash and powered from freely available energy, and with a view toward exposing people to the of magic of the physical world. There will be oscillators and motors and pumps and strobe lights and magnetic pickups and all kinds of blinking lights and speakers for sound and microscopic views of living things.

The electrochemical probe and full robotic system belongs to the second volume on Trash Magic. That is geared to people who want to delve deeply into the way electromagnetic trash magic works, focusing on fluid ion transport to interact with living systems, along with the basic infrastructure needed for a good life. The more advanced stuff will be just described in the first volume, not built out with detailed plans.

What does this mean for things to build?

Materials and how to mount things in place matter. This gives me an excuse to go down to all the creeks and find the right sticks and rocks and trash locally that

can be repurposed for an installation. Some missions will require stealth.

Viewing of microscopic objects must be extremely robust and require no turning on or off or care on a day to day basis. Obviousness is key here, the view port has to be so obvious that everyone will automatically use it. Also the subject has to naturally flow in constantly, with some trickle from a living stream so that something interesting, whatever the subject is, is usually present.

What specifically needs to get built to have finished products, and where do they go? Some things will be deployed in wild areas, some in urban areas, and some will be gifts to artists.

A tentative and partial list of Guerrilla Faery Art:

USB charger with water wheel water wheel that generates electricity which drives oscillator stick with rocks on it, just vibrates forever with feedback same, but with LEDs with a pattern to make 3d POV art in the water water wheel turns triboelectric generator using bottles and such to build up high voltage which creates an arc over the water between aluminum covered plastic bottles, very visible at night! art piece as gift where a vibrator vibrates water, making waves, which can be observed using a strobe, and turned into audio with a magnetic float and amplified magnetic pickup. With the magnifier built into the wood/plastic/stone water containers, this connects the main technologies if it's USB powered, and is the perfect Main Gift for this phase. 3d manipulator

with 3d input, hung from a tree or bridge over the water, which powers all motors and control circuits. Anyone happening by and seeing the setup can grab the input rock and move it around, which will drive the moving platform around in 3d space above the water. This probe can have the crude sonic electrochemical probe tuned to respond to depth in the water, so that the user can make sound by controlling the probe around in the water. Here art, science and technology are all one thing, built from trash, and in a public place with no declared ownership. water channel with strobe and vibrational drive for visual effects at night, driven by water wheel, runs all the time evaporative cooling refrigerator driven by water wheel hotplate driven by water wheel warm water pool heated by water wheel and generator steam powered organ using tubes and steam generated from water wheel datalog of creek which can connect to phones and twitter

Focusing on the main thing for now it's probably the USB driven art piece without the generator, just a wall charge for a off the shelf lipo battery, or left plugged in. A wave tank with a strobe can have a tunable 2d shape projected by the sun down onto an area, with musical output based on the wave patterns. This could be installed in a tree, projecting through glass, with water piped from the top of a waterfall. But what powers it? No, I need the charger for the guerrilla installation, but not for the art gift.

Art gift should be simpler than that, project up and

along the side, with lights under transluscent plastic in the stick. Vibrator stick with rocks on it bounces, with a stick that can be adjusted to agitate the water with different wave shapes and frequencies and amplitudes. The magnets and rocks can also be moved to change the properties. Water propagates down carved channels in a fat bottom stick with the drive stick bolted to it as well as the bouncing stick which is fixed at the end opposite the water. Lenses can be put above the water to magnify what is in it as well as to project light in various directions both for art and for observation. A little wave pool at the opposite end of the water agitator has a float with a tiny magnet in it, and the audio flux amplifier is wound around this pool, so that the sound is picked up and amplified and has an audio out socket. A beautiful carved wooden knob is used to adjust the strobe properties by changing a 555 circuit.

This is the first thing! Build this art gift first, before the water wheel, it's self contained and can be distributed and used in classes I can teach and spread the work. Lack of water wheel is not serious for most people since they charge devices anyway with USB and can get a lipo at a gas station for 10 dollars.

Chapter 11

Visions of a Better Tomorrow

Ent Moot

an ent is a slow moving giant tree robot that can walk, it can take years for them to gather but they do gather, and along with their human care takers build stuff together then move on, very slow

Memoirs from a Bathtub

The Universe is in my bathtub. All things and all people. And today is bath day. Well, yesterday was also bath day but today is *epic* bath day. Today the bah goes out to the world. I wake up in a roost under a bridge made

from the usual Trash Magic infrastructure. I do some basic hygiene stuff, then roll over the side into the tub waiting below, plop. I reach up and work the controls on the roost to reset it for the next person, then lie back in the tub as the current starts to pull it into the main stream.

The journey begins with setting a flag in the tub to summon a coffee drone, and just lying back to watch the morning clouds above. To set the mood for the day, I put White Rabbit on loop on the Trash rig, nice and loud. Then I kick back and wait for it all to get rolling. The coffee drone soon paddles along side my tub, and I grab a cup and bagel and focus on those for a bit while the main current drags the tub toward the Center.

Storm's a' commin'

A storm is coming! So many joules of energy! We will build all the things, set things on fire, move heavy things around, describe the world of the sunken city built back up from the water out of trash wizard compontents

wizards rolling in the valley

rolling robots going up and down the water, littoral robot ideas, using the creek for power and trash sources, clean up the river, make habitats etc.

Ramblin' youth

young trash wizards gather for a giant party in the jungle, build crazy shit

Riding Against Thor: the story of warriors of the storm stealing clean water from the gods of Thunder

LIke the other storm story but more epic and a smaller group of more risk tolerant people, the warriors of the future, riding to glory by harnessing the storm

Living in the deep ocean, on the surface, in the storms, giant systems of mechanical oscillators that absorb the incoming energy of the storms and turns it into useful work, processing sea water and trash at the same time, storing energy, moving around, and making head, having a fucking party.

Lazy river should be the main form of transportation in the future. Humans should live in the river deltas of the world, in clean water channels, in a civilization based on trash magic industry.

Bathtubs, where we are all The Dude in his bath with his joint and his whale song music. THAT is the FUTURE.

The inundated cities of the future can be a paradise, with storms making an ultimate comfort environment, light, sound, heat, air conditioning, breezes, smells, vi-

brations, motions, lazy rivers, free drugs, all made as the storms churn through, free energy free trash magic tools, free food, free space and time.

Must build electric kayak ASAP.

Really huge diamondoid matrix going for a mile on each side around the eye of a pacific storm, all made from trash, giant artificial mushrooms float around inside the matrix, hookah smoking caterpillars.

Poop Story

DOOM DOOM DOOM DOOM

I can hear the drum beat over the hill, it makes me want to poop. Climbing the hill, as I come over the crest, I hear the guitars before I see them, with several epic metal interpretations of the infamous Brown Note. As I come down the hill into the clearing, the drums start to shake the ground, lines of shirtless drummers across the earthen mound pounding for hours, a couple with joints hanging out of their mouths.

The guitarist is, as usual, suspended from a hydrogen aerostat floating above, strapped into a harness hanging from several cables that allow for full 3d motion, while shooting 10 meter flames from the flame thrower in the guitar in all directions.

Down on the far end I can see where the open pissers are peeing around in a stone and glass area that funnels the liquid into containers made from reclaimed glass beer

bottles, converted to alchemal extraction tools, to get all the precious minerals and drugs out of the pee, as well as the pure water which is removed and used to make lemonade for the musicians above. But we segregate our bathrooms in a logical way, for good reason, I have SERIOUS business to attend to and head to the opposite end of the toiletsphere, where people with serious latrine business must all go.

I choose a particularly awesome looking stone throne, head into the chamber, close the door, and now have a well lit one person sealed stone room all to myself. I sit on the heated stone throne, kept at exactly 88 degrees F using temperature controlled oil flowing through holes carved into the living rock by various cyborgs built from genetically modified rock eating fungus and some constructor drones. I now brandish my stick around in an easily recognizable way, alerting the local music machine to play sounds that correlate with the booms and shreds above, but with my own spin: stream and rain noises, with some German industrial noise music mixed in.

More brandishments of the stick call up a math paper I've been working on in the cloud on the shit paper unit, which I stare at for a while while nature takes its course. Having dropped an epic deuce, I again brandish the trash magic stick, summoning the turd courier drone, which grabs the turd for further study and use. I now clean myself up with the paper which was a math treatise a minute ago, throw it into the toilet, and have it

get dragged off by another drone to the compost chamber where it will be turned into food for fungi which will be food for the hemp plants which will make the next generation of toilet paper for future users(watered by the water extracted from the urine).

Now I wash up in the sink, indicate to the chamber that the cleaning robots can flush the space clean and remake it for the next user, and move on through the exit door which leads to the opposite side of the berm that the toilet room is in. I stroll out the door, which closes behind me and locks, ready for the next user from the other side. From there a short path leads down to the Science Swamp. Here I see a bunch of nerds in goggles, some with surgically added gills, wallowing around in the muck, hair covered in duck weed.

"Hail E Coli!" I greet them as I give the proper gesture of rubbing the gut and hopping around.

"Hail E Coli!" they shout back.

I tell them I just came down from the Lemmy Pod up in the severe end of the shithouse, just now, and point to the one I came from. Oh yeah, they say, we just saw yours roll in. An image appears in phosphorescent swamp muck across the surface showing a turd being carried by a spider-like droid through a underground tunnel and dropping it into the fluid pool of an analysis pit with a plop. I see the closest turdNerd who answered before reach out and grab a pair of stones hanging suspended under the water from some nearby steaks pounded into the swamp.

I can suddenly see the screen on the surface of the swamp come alive with the images that the coli witch sees in their goggles. What do they see? Both what the probe "sees" and what the infrared camera sees, as well as another screen that shows genetic information, with some strong artistic liberties taken by the local group here as usual.

"Oh yeah. Good stuff, good stuff."

"What?" I ask

"I don't know yet, but I see something in the genome here. Something metal as fuck. Something that should help with The Project, which we've been working on here. And my sensors are picking up some sweet metal here in the turd which should work for building nanoelectronics. Here, since you used our toilet, I'd like you to take this, and make some more, does that sound cool?"

"ummmmmmmm. . . ."

"It's cool. It's a methane and hydrogen dirigible drone designed to go spot trash for you. Pretty standard, but with more metal shit and turd iconography than usual."

Well, fuck yeah metal is why i shit here. "yeah, i'm in, hell yeah, i'll spread the word, I can show some of those cliff diver people how to make this version when I head down there for the Big Storm."

When they hear I'm heading down there, they get excited, and start laughing. What, I ask? What is your deal?

Well, they've used their methane fire tools to build yet another invention: a human cannon. they offer to fire me in their cannon down to where the cliff divers chill, and I agree, and off I go, folded up Heavy Metal Shit Drone safely in my backpack.

When I reach the peak of the trajectory, I hail a skyhook from one of the aerostats with my magic stick, grab onto the cable, and start riding down over the trees toward the Cliffs.

Chapter 12

Free Everything

We must Build these:

- free medicine
- free transportation
- free food
- free water
- free communication
- free robots
- free energy
- free clothes
- free art
- free sex
- free love
- free books
- free sports

- free games

Free Medicine. This is perhaps the most transformative on the list, and the most important. It is also a huge challenge and potentially dangerous. Perhaps a good place to start is with medical metrology. There needs to be technology which is free in the ways described in this work which can be used to measure the purity of drugs. Many illegal drugs are as dangerous as they are largely because they are mixed heavily with mysterious random chemicals added by the capitalists to increase their profits which are often poisons. We need to build up the ability to measure the chemical content of street drugs fast and accurately and with verification anyone can understand.

The other main points of early research effort should focus on either the most ubiquitous or the most expensive life saving medications. We must learn to use the techniques of brewing and genetically modified microorganisms to make designer medicines, We need to build up the post capitalist drug industry in a safe way by building the metrology into every step to insure purity and safety.

The very early phases of Trash Magic need to focus on building techniques and tools that are maximally general which can be used for all drug development and production. The only way to do this efficiently given how many life saving drugs we now depend on is to recruit heav-

ily from inside the existing biotechnology establishment. We need to find the disgruntled geniuses in that system who are sick of it and desperate for a way out. They often signed up for that industry to save lives and find out they're part of a giant scam to rip off or kill the poor and bleed everyone else and it's depressing and leads to a desire to leave as well as to change our broken society. I do not anticipate that it will be hard to find talented biotech experts who want to join us once we've shown that our movement can do good science.

In keeping with the philosophy of Trash Magic, we want to integrate the more traditional "magical" views of medicine with the *techniques* of modern medicine. That is, as with chemistry and physics, the goal is to take the very valuable information contained in modern science and reorganize that information in more human ways looking to other models that exist in our history(various healing traditions outside conventional Western medicine).

Finally I want to bring up another important technology to develop fast in this process: imaging. We need FREE medical imaging. I have thoughts on this, which will go in the second volume and probably the third volume of this work, but I put this here as an open problem for the reader in this volume.

Free Transportation and shipping. The ability to move freely from one place to another is yet another basic human right which should be guaranteed by a civilized society but which is denied in our current system. What

does free transportation look like? I think the lazy river is a great example of a potentially free transport system. A lazy river is a popular attraction at water parks in which an artificial river is created which flows in a loop, allowing humans resting on inflatable tubes to drift around the full loop over and over, getting in or out anywhere.

I would propose that one of the most human friendly ways we could move around is with a larger and more robust system of lazy rivers. We could make waterways which are pumped using water power from the overall net current. Ideally the water could be floated on with a variety of inflatable personal watercraft which float around with no owner, waiting to be used. This could involve staying dry or being partially immersed or totally immersed, and it should include craft which can carry substantial freight, also an essential use of transportation.

Obviously a giant lazy river with free boats is a massive challenge for the early stages of this movement. I propose that a way to build useful infrastructure now is to focus on rivers, and building transport for goods that goes both ways with cables under the sea that can haul freight upstream driven by the downstream flow. This could run indefinitely with simple repairs over time, and could immediately be used by many people for both utilitarian and artistic purposes. One could put free stuff in the feed, let it flow up and down the stream, and it could be grabbed and used by someone anywhere along the line. This would mimic the basic functionality of the

rotating sushi conveyor belt, where a stationary person can see all possible types of sushi pass by and grab what they want.

Another type of transportation which I think should exist after capitalism is skylines. This is difficult, but worth building. As with the lazy river, they will always go in loops, allowing people to get on and off anywhere for free, ideally in either direction, but with ropes or cables going infinitely, powered by ambient energy such as flowing water or wind. These should have built in measurement technology that allow users to see various safety parameters in real time and fix the system as time passes. Skylines can also be suspended from various types of aerostat, both hydrogen and soaring types.

I also imagine very slow moving giant spider robots which freely roam the countryside, and which anyone can get on or off of at any time. These might be many meters high, and have a whole industrial ecosystem on board, including growing food, and a local culture which is spread as the great lumbering spiderbot roams the world.

Finally, I must address the underlying issue of transportation in capitalist society: much of it is to do things we don't really want to do, and we won't have to do it anymore once capitalism falls apart. We often travel to get things which should in be available locally but which capitalism make only available in certain central locations, and we *mostly* travel to do work we don't want to do which no one really needs done. We must end central

industrial control of goods and food and we must end the wage system. With these changes, and with a free type of medicine anyone can get anywhere, we would only travel to see friends and family and to have adventures. This changes the goals enough that it will inevitably lead to drastic and unanticipated changes in the structure of transportation in a post capitalist society.

Free Food. This is almost too obvious to go into much, as it's where most anti-capitalists start. Food needs to be *really* free, though, using the stricter definitions of free from the second chapter of this volume, rather than just "no money" type of free. This means not only should you not have to spend work or time or money or minerals to get food, food should simply exist in your world, around, moving on its own using the types of transport systems described above. If you want a carrot, just keep an eye out and a carrot will drift by on a skyline or a hydraulic channel or a spiderbot. Since the technology of automated food is so extensively studied in other people's work I will be brief on this topic here.

Free Water. Water should be free! Truly free! Why is this so hard for capitalists and their collaborators to understand? From our standpoint, this means dirty water that will kill you should be turned into clean water you can drink on its own, without any work, all the time, with such plentitude that it is essentially a part of the natural process of the world we live in. Capitalists already sort of do this with their system of reservoirs that

collect rain water, which is essentially solar-purified water. They then hoard this and charge money for it and centrally control it, of course.

Constructing infrastructure which directly converts smaller amounts of water forever in different ways is key for freeing ourselves from the Machine. This should exist, floating freely, in the ocean. Humanity must return to the oceans, and we should bring fresh water with us. Huge floating fresh water habitats should appear in the oceans.

Also, water purification should never be about just water. It should be about the things we can remove from the water: heavy metals, salts, biological chemicals, microorganisms, etc. All these should be constantly observed by people, who can then use them as needed.

Free Communication. This is another place where I have to distinguish between this project and the "maker" or "hacker" movements. To a typical mainstream hacker, a "free" phone would be one with enough encryption to ensure total freedom from government interference. This is not a useful definition of free. The world they are building is one in which you replace the government snoops with corporate technocrats who build your "free" gadgets. Nothing built by a corporate technocrat is ever free. I would argue that free communication means you don't have to have any interaction with the technocratic priesthood at all. That means it is so simple to build, edit, artistically enhance, and use that it's *obvious*, and

can be done by anyone anywhere any time.

What does this mean in terms of practical technology? For one thing, way more use of analog. One of the ways the technocratic priesthood has built a strangle hold on our communications is by having so many layers of horribly complicated digital software infrastructure that is needed to do anything. End that.

I would say the starting point for our free communications network is free space optical point to point analog voice links. This can be done with the magic sticks in the earliest phase of this project, leading to immediate deployment. Could encryption be used in this system? Sure, yes. But do you really need encryption if you're using a system like this? You're basically shining a flickering flashlight at someone. Going optical(without lasers) is also important because it avoids conflict with the government bodies that tightly control the frequencies normally used for communication.

To be specific about what this will look like, it's the Trash Magic Stick with all the aspects that go along with that. That means you get it free as a gift normally, can easily build more and gift them on, and it needs no grid energy to function, anyone can use it, etc. Using vibrations of air and water to modulate fire, analog voice signals should be made with light, and then photo diodes and amplifiers demodulate the signal from a telescope built into the stick and play the amplified sound directly out a speaker.

Free space point to point optical can be(and is being by capitalists) scaled up to the global level. The capitalists have built so much dark fiber in their speculative bubbles that we should be able to augment the free space optical with free optical links in tunnels after things start to fall apart on that side. Also while the capitalist Internet still IS running, it should be possible to extend their networks all over using optical repeater stations we can put in free in our between-the-cracks infrastructure.

Free Robots. This topic is so important obviously it got its own chapter but I'll briefly add here the reminder that a robot is not really free unless you can build it yourself modified for *your* needs. That is, you can see a need, then build and program and use a robot to fill that need, for pretty much any arbitrary need within the scope of what a kind of robot can do. That is what makes it free. It is very easy to fall into the trap of building robots that appear free but still need a technocratic priesthood to function. Avoiding that is probably the largest challenge of making truly free robots, as good people have already been working on the other parts.

Free Energy. Another obvious but important one. I disagree with much of the "green" Left who believes in giant solar and wind projects, as they have a tendency to perpetuate the existing industrial systems, just with lower carbon impact. Unimpressive. I believe truly free energy has to come directly from your environment right where you are. It's *personal.* And it should al-

most never be just energy. Flowing water can and does fuel whole civilizations, and is not just a "energy resource" to be used(generally by those with money) and dumped(generally very polluted and on top of those without money), as is so often the case. Moving water should be our first choice in most cases for an energy source. Ultimately I claim humanity needs to return to the sea and that the best long term source of energy is the waves and tides there. I would place wind as a distant second place for sources of constant energy for electricity and mechanical work after the various hydraulic choices.

There are two other kinds of energy worth discussing here, though. First is heating and cooling, which we spend a lot of energy on, and which are critical to both our survival and comfort. I believe that heat should be solar or geothermal and cooling should be from water and/or cooling from the deep cool earth. There are almost always major heat sinks and sources around us if we bother to look and are not bound by the limitations of our private property religion. Migration should also play a role. Why should the same number of people live in a far northern city in the summer as in the winter? The answers now all involve private property, wage labor, and national borders, all of which I believe should be abolished, leading inevitably to more natural migrations. The final type of energy is Storm Energy, which is where a vast amount of energy is used to complete a mechanical and or chemical and or electrical task in a

short time during the duration of a storm. This will take lifetimes to build and perfect but as the world gets more stormy and we move back to the oceans we will build it.

Free Clothes. Enough of buying clothes made by wage slaves and sold by criminals! We need to start getting all our clothes not just from the trash of the dying society but we need to build more free technology into them. If we're building our own clothes from trash, that should include things like goggles that can see microscopic organisms, infrared, various data visualization etc. Also, illumination should be built in standard, as this is an obvious safety issue at night, where the capitalist forces you to go buy a flashlight.

Free Art. This is the seed! This is how it all starts. We are, first and foremost, an anti capitalist artistic movement, meaning we make art, give it away, and teach others to make more art. The elements of this are throughout this book so I will not dwell on them here.

Free Sex. How do the capitalists put a cost on sex? For one thing, by holding all the various technology to detect and treat sexually transmitted infections hostage behind their absurd paywalls. A full battery of tests can cost many hundreds of dollars in the USA, seriously impacting peoples freedom to control their own sexual health. Also birth control and abortion and other forms of basic body autonomy are not free until they are *freed* from the "ownership" claimed by the capitalists. This is addressed in the medical sections of this work.

Free Love. What do capitalists do that most hurts our love lives? It comes back to the same reason we don't migrate in response to drastic weather changes: private property, wage labor, and centralized industrial production. Without these, you would be free to go meet new people, and when you meet someone free to live *near* but not *with* them, making a much smoother transition to different stages of a relationship. After you are in a relationship, the freedom from wage slavery and its associated devaluing of non-wage labor creates a much better environment for that relationship to thrive.

Free Books. No more dead trees! And not hemp paper either. We need books that are as physical as what we use now, but which can be made from plastic trash and thus are waterproof. This technology already exists, we simply need to build a free version of the machine that prints that way, and adapt it for use with really raw trash, and integrate it into the rest of our industrial ecosystem. It is my intent for the physical versions of this book to become closer and closer to this ideal as new editions come out, so this volume is a physical manifestation of wherever that process is right now.

Free Sports. Capitalism distorts sport. The focus on numbers creates an obsession with making and following a score and rank system as much as possible. The wage system forces coaches to also be business owners, which seriously undermines their roles as coach. Sports need to be free. That means no scores, no leagues, no

tournaments, no wages, no money, no mining!

Free Games. Industrial manufacturing should be a game! And we should all be able to play that game for free. This is not just a manner of speech. Augmented and virtual reality are likely to play a large role in future industrial production and those are always a grey area between "game" and "work" and "art". I say we call it all art, seize it, and integrate it with the rest of our creations.

Chapter 13

Techniques

In this chapter I discuss the fundamental techniques that I have used and plan to use in the near future in the actual practice of what I call Trash Magic. This chapter will change drastically in future revisions, and inevitably older editions of the book will look very dated as this part changes. It is tempting to work on this for years and to withhold publishing this manuscript until these techniques actually work well and can be used to make a variety of really nice things. But since a large part of the purpose of this manifesto is to provide my own guide for my work, I will plow ahead with some rather immature technology here, and it will be saved for posterity and will serve as a starting point.

I begin with sticks, because they're fun and easy and do a ton of things.

Finding the Right Sticks

Don't hurt the trees! We want sticks that are no longer part of a living tree but which have not yet been consumed by fungi and other organisms which turn logs into dirt. Drift wood is also often too far consumed to be of use, although this really depends on the drift wood. What we want are freshly fallen sticks from living trees, mostly. And we're looking for them to be between an inch and 2 inches in diameter, mostly straight, with not too large knots if possible.

A lot of electronics projects are perfect for sticks about 1 inch around and 4-12 inches long, so gathering and preparing these is a good idea. Load bearing parts for larger constructions should be more like 1.5 to 2 inches in diameter, or bigger in some cases.

Do not be surprised if finding nice sticks is harder than you think it should be. It can be surprisingly hard! If you live in a humid place with a lot of rain and water and life, you'll find that sticks get rotten *very* fast. Sticks that have been out in the weather for a long time in a dry climate might be rotten while still attached to a tree in a more humid place. I've spent a lot of time using pine as well as maple at various times. Pine is pretty soft which is nice for getting started, it can get frustrating to spend a lot of time trying to cut a maple or oak stick by hand, especially if you're just trying stuff.

One more thing to mention about pine is that aside

from being easy and fun to work and very common all over the world there is presently an epidemic in the American west of beetles killing large numbers of pine and spruce trees. These trees, once dead, are simply a giant fire hazard that no one wants to deal with, making an unlimited supply of sticks for the Trash Magician to use should they choose to go forage in that area.

Processing Sticks Into Skeletron

After locating the sticks, you'll want to saw the ends off flat so that they're not jagged. I often find that it's easiest to gather sticks by hand without carrying a saw with you when you go out. You can often rip the branch off by leaning on it with your whole body, be careful you don't hit yourself in the face!

I also find that for this stage it's good to have two hand saws: one is a big rip saw with huge teeth that very quickly will cut through wood but is specifically not intended for metal. The other is a much smaller screwdriver-like saw with a more hacksaw like blade for easy carry and use on random materials including plastic and metal. This tool is also useful for removing knots and branches from your main stick branch.

Once you have your sticks of about the right size, you want to shave off all the bark. This is done with any of various types of pocket knife, and I find it useful to have a multi-tool of the kind that is also a pliers and

screwdriver and such for this. Ideally you'll do this where the massive pile of bark and shavings will be useful for something, like grinding into sawdust which can be used for a compost reactor. At the very least somewhere there is already mulch will mean you don't have to clean it up because it's adding to the existing mulch.

Once your sticks are shaved and cut at the ends, you cut them to size, shave two flats, and then file the edges smooth(simply for making it nice, this is not really functional). I generally shave at least enough flat space to make a nice point of contact when connecting them using the quarter inch bolts, so at least a half inch of flat space is called for, maybe more depending on the application. For simple electronics projects I'll tend to shave the stick down until the whole thing is about half an inch or maybe 3/8ths of an inch thick.

Finally, I generally drill a series of holes down the middle through the flat, spaced by at least an inch, sometimes more like 3 inches or more if I don't need many holes, or with one strategically placed at the "base" for an electrical project as a strain relief for the power cord(mentioned soon!) At this time I drill the holes using a power drill and a quarter inch bit, generally clamping the stick with a c clamp to my work bench, which I drill holes in all the time. My bench is a cheap door on a pair of sawhorses. I also often use a small vice clamped to that bench for holding the stick while cutting holes. Trying to cut holes with a drill without some form of clamp is usually a bad

idea, is dangerous and is not recommended.

Finding the Right Plastic

I have found that the best plastic for our purposes is LDPE and HDPE which stand for low density and high density polyethylene. They are indicated by the recycle symbols 4 or 2, and are mostly cross compatible.

The easiest source of HDPE for most of us is bottle caps. Standard plastic soda bottles which are made of PET or similar plastics that I find more annoying to work by hand usually have caps made of a opaque material which is typically some color like red or blue. Anywhere plastic trash can be found, you can probably find these caps. You don't care how much they have been smashed, but you do care a bit how dirty they are. You can always grind or cut off the really gnarly dirt with a knife or file or similar sharp tool if there is too much crust on the cap. It's generally a good idea to have a small bin filled with these caps near your work area.

Another great source of plastic, which I use for small electronics work especially, is the translucent(but not transparent) plastic generally used for plastic milk bottles. It is also used for various citrous juices such as orange and pineapple, so if you don't drink milk that's probably a better bet. Some 1 gallon water containers from generic brands of bottled water also come this way, and those can be found in plastic trash piles by various

creeks sometimes. I avoid milk bottles I find that way due to what happens to milk when it's been out a few days. I drink milk at home and when the bottles are done I try to immediately wash them out, rip them up, and put them in my plastic material bin.

One way you can get some containers like this if you don't normally buy them or drink milk is to have a party where the main drink is maitais or some similar fruity cocktail. You can get orange and pineapple juice in these containers, and mix them. If you want maximal containers, get the smallest they sell, and invite a ton of people who like to drink and you'll have a few containers to work with in a few hours.

Finally, another source for LDPE for very large scale projects like building boats is traffic barriers, the big orange kind. Don't steal them, they'll end up in the trash eventually, take those and cut them up with a hacksaw(they're too thick to cut with a regular knife, although maybe if you have a giant sword that will also work).

Plastic Welding

I'm sure there is a way to do this using really free tools, which I do plan to build. However for now I'm using a very capitalist tool, the temperature controlled hot air rework tool which I also use for surface mount soldering. It can be purchased for 50-100 dollars online. I believe

that a hair drier will also work, although the weld process will be harder to get right due to a lack of continuous temperature and flow control. I set the temperature to 130 C. If you're using a flame or hot air gun without temperature control it should be possible to measure the temperature to target that or just figure it out by trial and error, which is how I ended up at 130 C in the first place.

The goal with working with HDPE and LDPE is to get it to transition from solid not to liquid(which you'd use to do injection molding, and that's well documented on youtube by others) but to glass, which lets you bend it and weld it but it still has structure. When is it a glass? With the translucent stuff it's easy to tell: it goes from the milky translucent color to fully transparent pretty suddenly as it hits the glass transition which is actually very neat to watch! Obviously all this is hot, so don't touch it, and be aware that it stays hot after you stop heating it for a few seconds at least unless you hit it with water or something to cool it down. Just because plastic is below the glass transition doesn't mean a 100 degree C thing won't burn you!

As a first weld project I'd say take bottle caps, cut them up, heat them until they're kind of floppy, and are right next to the, moving the heat source back and forth between the two bottle cap shards, then when they're clearly a bit gooey, touch them together, and they should stick, then heat the combination a bit more, maybe an-

other 20 seconds. Then when it's clear that they're both gooey and are sticking a bit, get your pliers or tweezers and start smashing and squashing to get the two to plastic parts to mix. This is the same basic welding technique that is used for various food technology like the calzone: the weld joint on the top and bottom bread in a calzone looks just like the plastic weld joints you'll make with bottle caps.

Salvage Components From Busted Electronics

This section is going to be short because right now I still buy a lot of electronics from the capitalist enemy. As capitalist enemies go, however, Digikey.com is awesome. There are several companies that sell electronic components online, with fairly similar prices and selection. If you want to compare them, the site to use is octopart.com, a startup company out of Boulder, Colorado which compares all the prices and stocks of the different companies. That being said, I use digikey exclusively so that I can have a consistent bill of materials for everything, which uses digikey part numbers. Digikey can often deliver a part to you within one day in most of the USA.

As for salvage, the main electronics components I've been salvaging so far are power supply related. I have

found the the best way to get a power brick open is to swing it by its cord in a huge arc over your head and smash it on concrete repeatedly. It's sort of like a particle accelerator, you want the largest possible swing with acceleration the whole way to get the maximum velocity of impact. It's best to do this on clean cement with a broom so you can easily sweep up the bits as it explodes. The plastic case will explode but the components should be largely unaffected by the smashing. The good stuff in there is likely to include transformers, capacitors, diodes and bridge rectifiers. Other things in there will be used more in future versions of this work.

I will leave this section brief since it's very much a work in progress. I'd rather finish this book and then extend this later than delay the book while I do the research required to have good specs in this section.

How to Solder

The best way to learn to solder by far is to find someone who can solder and get them to teach you face to face, it's a very physical learning process. One thing all forms of soldering have in common which I want to mention here is the need to get the actual metal being soldered hot, not just the solder. The biggest mistake beginners make is not being patient enough in heating the other metals that are not the solder. Also note that whatever

is the most massive metal piece will need the most heat applied, be it by soldering iron or hot air gun.

When I use the hot air gun to solder, it's always with solder paste, and I set the temperature to 230 C.

Sticks for Hydraulic Machines

This is another section that has to be a bit of a placeholder in this first version. Sticks can be used to make various direct mechanical machines driven by water. Water wheels made from simple arrangements of sticks should generate electricity to be used in that same apparatus, as well as to move various belts and cables to move things around in the world. Water wheels should also be used as a replacement for many electric power tools, and a high research and development priority is building a power drill replacement that runs on water.

Sticks for Fluidics

Ultimately, the stick technology should have fluidics built into it. This means channels, chambers, pumps, valves, and electrical/chemical interfaces. I've done some very crude experiments with this, but since nothing is really complete this is a place holder for now.

Chipping Rocks

We must bring back stone! Not just for decoration but for weight, for fluids work, for electronics, and for many other applications. Part of the Trash Magic skill set and tool set must be for simple stone work. I have been pounding rocks with other rocks and reading a bit about this, but still have not fully developed the skills.

The one rock skill I have acquired over the years is that if you grind a rock against pavement for long enough you can polish one side smooth enough to "skate" on, and can push that rock around under your shoe like a skateboard. This can be amusing, and led to all rock grinding on pavement being banned at my middle school.

Measuring real time voltages and fluxes with an Arduino

Measuring voltages in real time should be easy. And yet it's often a huge pain to transition from doing this in a over-equipped over priced lab to doing it as a rogue element. The trick is to use the Arduino's analog to digital conversion, with the new Arduino software's very handy plotting feature. I generally make a voltage divider with a pair of 10k resistors from 5V to the Arduino ground, with the midpoint connected to one side of the thing to be measured, and the other side connected to the ADC. This is not useful if you're measuring something connected to

the Arduino ground! But if you want to measure something like induced electromotive force in an inductor it's great, as long as you don't go over voltage and blow it up. More on this in future versions.

Measuring Electrical Transport of Slime

This will be covered in very great detail in volumes II and III, and I don't expect this to make a ton of sense now, but basically my method involves putting small amounts of charge onto and off of a capacitor quickly and observing the voltage response. Doing this fast can create an audible signal that depends both qualitatively and quantitively on the impedance, and can also be used to observe nonlinearities through various doublings etc.

Finding Creepy Crawlies

The real Trash Magic Sticks will have optical microscopy built in, along with the plumbing to move water with little creatures around to observe them. For now, I have a very cheap plastic toy microscope that I carry around on my bike and try to find tiny bugs with. I've seen some paramecia, some bacteria and the occasional tardigrade shooting by in the water. Finding water rich in life in Colorado is a bit tricky, but where it's slow moving and covered in bugs is generally a good bet.

Design a new 3d Thing

Blender! Blender!! Blender is a free open source software package used for 3d design, primarily for artists. I used to use commercial CAD software but that is not compatible with the values of Trash Magic so I had to switch to something free. It turns out that while the professional CAD packages are better for professional CAD, that when we abandon the concept of professional engineering and take an artist's approach that Blender is actually superior. I will not digress with my own very poor introduction to Blender as I'm still learning the basics myself. It is, however, going to take a larger and larger role in the manufacturing and design in Trash Magic as more virtual reality and augmented reality systems get deployed in the future.

How I Wrote This

My creative process is to think on things for a long time, then write fast as a synthesis of that thought. The thinking process combines long library visits, long walks, long bike rides, Brazilian Jiujitsu and extensive use of edible THC products purchased in Colorado.

Actual writing generally takes place in a coffee shop, on the couch at home or in the library, usually in quick bursts of under 2 hours of work. I did the writing on a MacBook Air purchased around 2012. Most of the writ-

ing took place in the Markdown editor known as Mou. I used GitHub Desktop to manage the versions and backups on Github, which I used for my could backup as I went. Each chapter is its own Markdown file. A shell script uses Pandoc to convert all markdown files to tex files. A file I call main.tex then imports all those tex files as chapters and provides the format using the LaTeX package "memoir" to generate the actual book pdf.

Illustrations were generated by drawing things in pencil, inking in the stronger lines, taking a photograph with a small cheap Sony digital camera, importing the bitmap into the free art software InkScape, and then traced into vector graphics. The vector graphics are then re-sized to fit in a four inch width, saved as .svg files, and then exported as 100 dpi png files which are used for the actual figures in the document.

How to Color Your Wood Stuff

Wood things should often be at least partly colored, not just for art, but to code different parts differently so they're easy to follow. I generally try to have electrical nodes connected to positive supply voltage be surrounded by red, and the minus supply surrounded by black or green. I also tend to use yellow for signal and blue for higher current lines that are not power supply.

I have a set of colored pencils in my work area, which work great on raw, carved wood, but badly on plastic. I

also have a set of acrylic paints, the smallest and cheapest I could find, which goes on just about anything.

I believe most of what we make should be colored and that the colors should always serve both artistic and practical purposes.

Rope Work

I will not elaborate on this too much in the first edition, but I will just mention some rope techniques that are of use: - coachwhipping - Turk's head - clove hitch - bowline - bowline in a bight - dragon bowline - carrick bend - figure eight knot - double figure eight knot - monkey fist

Chapter 14

Let's Build This!

let's build this!

this chapter needs a "product" focus.

It will be these three things.

1. The vibrational drive with strobe driven by USB battery, pendulum and spring toys
2. Noise stick driven by USB battery
3. USB charger guerrilla art whirligig, with LEDs and glowing rocks

build a thing, start the story, teach it on, and deploy, for the three things, with examples and pictures.

I will list the things I'll leave for other projects/publications:

1. robots that roll around

2. 3d input manipulator
3. 3d probe
4. stepper motor
5. water powered drill
6. microscopy
7. fluidic pumps
8. cable to move goods around mechanically driven by whirligig
9. water pump driven by water
10. generic air pump for inflating anything, which is also generic water pump
11. electrostatic generator driven by whirligig
12. stone cutting machine
13. boat
14. heated composting reactor
15. oxygen and hydrogen generator
16. electrochemical probe
17. optical free space communications system
18. soaring high voltage drones
19. temperature regulator using stepper motor and solar concentrator with parabolic mirror from trash
20. thermometers

- how to make a thing
- how to ship a thing
- how you can get finished goods and join a value circle

- how you can make stuff and start a value circle
- how you can do a research project and start a value circle
- how to transport a thing from the maker to the user
- how to find your ambient energy resources
- what you can do to spread the word and build community
- Other academic work you can contribute as a scholar
- Machines you could build outside this system which can start a new value circle
-

This section should have some basic assembly plans and information to get started even without the second volume.

Things to make here:

- vibrational oscillator with musical pickup
- 3d input device
- 3d manipulator, linked to input device
- wood cutting for circuits techniques
- plastic welding techniques
- waterwheel generator to 5V USB charger

- skeletron guide, with pictures, cartoons, detailed instructions, several plans:
  - tent
  - water wheel
  - tripod for manipulator and probe
  - vibrational musical instrument
  - boat
- high voltage generator
- strobe microscope
- LED art vibrator display
- basic electrochemical probe
- temperature regulator with hoist and thermometer and fire
- ambient art pieces powered off water and wind that use electricity to do things which can be repaired forever by anyone and moved and rebuilt and replaced by anyone
- vibrator with polished stones as massager
- Josephson junction pendulum
- build a heated shit reactor with a giant tube and air pump to send gasses to the top of a tree

circuits:

- generic vibrational feedback drive
- magnetic pickup to audio output for music

- stepper motor driven by potentiometer so knob goes to wheel directly with one Arduino per motor+knob combo–three of these and two tripods is the standard manipulation space for a generic tool
- strobe with trigger and 555 delay and knob to tune delay, can be used for microscopy with vibrational drive of water position, control of phase delay can control focus electronically with no mechanical focus knob needed
- POV on vibrational object to make 2d image
- power supply circuit that turns output of AC generator coil into 5V regulated power
- step up board that charges a 50 V capacitor from AC generator coil input
- stepper driven by two digital inputs and two buttons for one direction and the other, with feedback coils for free running operation at variable torque
- electrochemical probe with audio output for conductance based on an RC oscillator and LED array to show average voltage, two joysticks to control the average voltage and the amplitude of the oscillation(with feedback): one micro controller, one neopixel array, a speaker with transistor drive, two joysticks, various connections with different capacitors and different wires and possible probes
- digital thermometer with serial bluetooth readout and up/down digital motor control output lines and LED neopixel indicator for direct temperature

readout, 5V Usb drive

- circuit to drive 120 VAC power plugs with output from a dynamo, with decent sized water wheels, I think this a UPS with a 12 V supply for the 12 V battery, should be made from trash
- interface between smart phone and pair of stepper motors for generic two motor robot control

this is a complete enough technical set that it can have a huge physical impact on the world even without the next volume, and then the next volume is truly a work for people who want to push the boundaries of science and trash magic together, with emphasis on applied physics. Maybe there will be a volume three that is biological and chemical

encourage collaboration so that those who don't want to learn electronics can get free electronics from those who do, and can find other ways to contribute, with art, assembly, craft, and the important courier service that needs to happen for distribution.

Recruiting couriers might be the most important of these construction tasks, as I will be always building more artifacts myself and spreading the teachings of how to do it face to face, which can't spread as fast as the book can. The book can spread *very* fast, and build a courier network so that physical artifacts can also if the book spreads the courier network very fast(it should also explicitly encourage readers to spread the word fast), and I

can make artifacts fast, the limiting factor in growth will be the spread of the craft of artifact creating and the use of the new things.

Thus my problem is the same as that of Kano in forming the Kodokan: how I teach the first students and how I organize the information conveyed to them shapes how they pass it on, and that will propagate through the whole subsequent series of events. How did Kano start? How did Ueshiba? Why was Kano able to build a more functional system than Ueshiba?

public guerilla art

how to do installations, how to fix them how to document them, how to expand them how to move them, documentation of installations around the world, USB chargers are best to start with

from the blog:

I have figured out the nature of the first phase of technology development: guerilla faery art. I've been getting distracted by the long term goals of functionality for industrial production, but for this first volume aimed at non technical readers, it makes sense to focus on technology which will make sense and be obviously worth spreading: guerilla faery art. What is this? Art outside the capitalist system, installed without permission, built from trash and powered from freely available energy, and with a view toward exposing people to the of magic of

the physical world. There will be oscillators and motors and pumps and strobe lights and magnetic pickups and all kinds of blinking lights and speakers for sound and microscopic views of living things.

The electrochemical probe and full robotic system belongs to the second volume on Trash Magic. That is geared to people who want to delve deeply into the way electromagnetic trash magic works, focusing on fluid ion transport to interact with living systems, along with the basic infrastructure needed for a good life. The more advanced stuff will be just described in the first volume, not built out with detailed plans.

What does this mean for things to build?

Materials and how to mount things in place matter. This gives me an excuse to go down to all the creeks and find the right sticks and rocks and trash locally that can be repurposed for an installation. Some missions will require stealth.

Viewing of microscopic objects must be extremely robust and require no turning on or off or care on a day to day basis. Obviousness is key here, the view port has to be so obvious that everyone will automatically use it. Also the subject has to naturally flow in constantly, with some trickle from a living stream so that something interesting, whatever the subject is, is usually present.

What specifically needs to get built to have finished products, and where do they go? Some things will be deployed in wild areas, some in urban areas, and some

will be gifts to artists.

A tentative and partial list of Guerilla Faery Art:

- USB charger with water wheel
- water wheel that generates electricity which drives oscillator stick with rocks on it, just vibrates forever with feedback
- same, but with LEDs with a pattern to make 3d POV art in the water
- water wheel turns triboelectric generator using bottles and such to build up high voltage which creates an arc over the water between aluminum covered plastic bottles, very visible at night!
- art piece as gift where a vibrator vibrates water, making waves, which can be observed using a strobe, and turned into audio with a magnetic float and amplified magnetic pickup. With the magnifier built into the wood/plastic/stone water containers, this connects the main technologies if it's USB powered, and is the perfect Main Gift for this phase.
- 3d manipulator with 3d input, hung from a tree or bridge over the water, which powers all motors and control circuits. Anyone happening by and seeing the setup can grab the input rock and move it around, which will drive the moving platform around in 3d space above the water. This probe can have the crude sonic electrochemical probe tuned to respond to depth in the water, so that the user can

make sound by controlling the probe around in the water. Here art, science and technology are all one thing, built from trash, and in a public place with no declared ownership.

- water channel with strobe and vibrational drive for visual effects at night, driven by water wheel, runs all the time
- evaporative cooling refrigerator driven by water wheel
- hotplate driven by water wheel
- warm water pool heated by water wheel and generator
- steam powered organ using tubes and steam generated from water wheel
- datalog of creek which can connect to phones and twitter

Focusing on the main thing for now it's probably the USB driven art piece without the generator, just a wall charge for a off the shelf lipo battery, or left plugged in. A wave tank with a strobe can have a tunable 2d shape projected by the sun down onto an area, with musical output based on the wave patterns. This could be installed in a tree, projecting through glass, with water piped from the top of a waterfall. But what powers it? No, I need the charger for the guerilla installation, but not for the art gift.

Art gift should be simpler than that, project up and along the side, with lights under transluscent plastic in

the stick. Vibrator stick with rocks on it bounces, with a stick that can be adjusted to agitate the water with different wave shapes and frequencies and amplitudes. The magnets and rocks can also be moved to change the properties. Water propagates down carved channels in a fat bottom stick with the drive stick bolted to it as well as the bouncing stick which is fixed at the end opposite the water. Lenses can be put above the water to magnify what is in it as well as to project light in various directions both for art and for observation. A little wave pool at the opposite end of the water agitator has a float with a tiny magnet in it, and the audio flux amplifier is wound around this pool, so that the sound is picked up and amplified and has an audio out socket. A beautiful carved wooden knob is used to adjust the strobe properties by changing a 555 circuit.

This is the first thing! Build this art gift first, before the water wheel, it's self contained and can be distributed and used in classes I can teach and spread the work. Lack of water wheel is not serious for most people since they charge devices anyway with USB and can get a lipo at a gas station for 10 dollars.