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The Problem of Growth

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Stuart Staniford proposed a "way forward" for humanity in his article Powering Civilization to 2050. This article proposes an alternative vision: instead of trying to create continual, technological stop-gaps to the demands of growth, we must address the problem of growth head on. Infinite growth is impossible in a finite world--a great deal of economic growth may be possible without a growth in resource consumption, but eventually the notion of perpetual growth is predicated on perpetual increase in resource consumption. This growth in resource consumption causes problems: it brings civilization into direct conflict with our environmental support system. Growth is also one way of improving the standard of living for humanity by creating more economic produce, more material consumption per human. Growth, however, produces very unevenly distributed benefits, and there is little convincing evidence that the poorest, most abused 10% of humanity is actually better off today than the poorest, most abused 10% of past eras. Furthermore, if you accept my statement above that infinite growth is impossible in a finite world, then employing growth today to "solve" our immediate problems incurs the significant moral hazard of pushing the problem—perhaps the greatly exacerbated problem—of addressing growth itself on future generations.

With that in mind, my intent here is to propose one possible means for humanity to directly address the problem of growth itself. I am attempting to take what I see as an inherently pragmatic approach—one that does not rely on the universal cooperation of humanity, nor on the assumption of yet-to-be-developed technologies. My approach to the problem of growth is to stop trying to address its symptoms—overpopulation, pollution, global warming, peak oil—and attempt instead to identify and address the underlying source of the problem.

That source is the hierarchal structure of human civilization. Hierarchy demands growth. Growth is a result of dependency. The solution to the problem of growth, then, is the elimination of dependency. This essay will elaborate on each of those points, and then propose a means to effectively eliminate dependency by creating minimally self-sufficient but interconnected networks that I call Rhizome. It is my hope that this topic, while not directly involving crude oil reserves or some similar topic, will be highly relevant within the context of Peak Oil and Peak Energy. Infinite growth requires, eventually, infinite energy. Assume that we develop a perfect fusion generator, or that we cover the entire surface of the Earth with 100% efficient solar panels. None of this actually solves the problem of growth—it just shifts the burden of dealing with that problem onto our grandchildren, or perhaps even 100 generations from now. It's easy to take the self-centered perspective that such burden-shifting is acceptable, but I find it fundamentally morally unacceptable. This essay will begin and end with that understanding of morality, and

attempt to find a way forward for humanity that balances the quality of life demands of both present and future generations. This essay isn't about how to find more oil, how to recover more oil, or how to use energy in general more efficiently so that we can keep on growing. It is an opinion piece, not a data-driven scientific paper. It is about living well, now and in the future, individually and collectively, without growth.

I. Hierarchy Must Grow, and is Therefore Unsustainable

Why must hierarchy continually grow and intensify? Within the context of hierarchy in human civilization, there seem to be three separate categories of forces that force growth. I will address them in the order (roughly) that they arose in the development of human civilization:

Human Psychology Drives Growth

Humans fear uncertainty, and this uncertainty drives growth. Human population growth is partially a result of the desire to ensure enough children survive to care for aging parents. Fear also drives humans to accept trade-offs in return for security.

One of the seeds of hierarchy is the desire to join a redistribution network to help people through bad times—crop failures, drought, etc. Chaco Canyon, in New Mexico, is a prime anthropological example of this effect. Most anthropologists agree that the Chaco Canyon dwellings served as a hub for a food redistribution system among peripheral settlements. These peripheral settlements —mostly maize and bean growing villages—would cede surplus food to Chaco. Drought periodically ravaged either the region North or South of Chaco, but rarely both simultaneously. The central site would collect and store surplus, and, when necessary, distribute this to peripheral settlements experiencing crop failures as a result of drought. The result of this system was that the populations in peripheral settlements were able to grow beyond what their small, runoff-irrigated fields would reliably sustain. The periodic droughts no longer checked population due to membership in the redistributive system. The peripheral settlements paid a steep price for this security—the majority of the surplus wasn't redistributed, but rather supported an aristocratic priest class in Chaco Canyon—but human fear and desire for security made this trade-off possible.

Still today, our fear of uncertainty and desire for stability and security create an imperative for growth. This is equally true of Indian peasants having seven children to ensure their retirement care as it is of rich Western European nations offering incentives for couples to have children in order to maintain their Ponzi-scheme retirements systems. Fear also extends to feelings of family or racial identity, as people all over the world fear being out-bred by rival or neighboring families, tribes, or ethnic groups. This phenomenon is equally present in tribal societies of Africa, where rival ethnic groups understand the need to compete on the level of population, as it is in America, where there is an undercurrent of fear among white Americans that population growth rates are higher among Hispanics Americans.

The Structure of Human Society Selects for Growth

The psychological impetus toward growth results in what I consider the greatest growth-creating mechanism in human history: the peer-polity system. This phenomenon is scale free and remains as true today as it did when hunter-gather tribes first transitioned to agricultural "big-man" groups. Anthropologically, when big-men groups are often considered the first step toward hierarchal organization. When one farmer was able to grow more than his neighbors, he would have surplus to distribute, and these gifts created social obligations. Farmers would compete to grow the greatest surplus, because this surplus equated to social standing, wives, and power. Human leisure time, quite abundant in most ethnological accountings of remnant hunter-gatherer

societies, was lost in favor of laboring to produce greater surplus. The result of larger surpluses was that there was more food to support a greater population, and the labors of this greater population would, in turn, produce more surplus. The fact that surplus production equates to power, across all scales, is the single greatest driver of growth in hierarchy.

In a peer-polity system, where many separate groups interact, it was not possible to opt-out of the competition to create more surplus. Any group that did not create surplus—and therefore grow—would be out-competed by groups that did. Surplus equated to population, ability to occupy and use land, and military might. Larger, stronger groups would seize the land, population, and resources of groups that failed in the unending competition for surplus. Within the peer-polity system, there is a form of natural selection in favor of those groups that produce surplus and grow most effectively. This process selects for growth—more specifically, it selects for the institutionalization of growth. The result is the growth imperative.

The Development of Modern Economics & Finance Requires Growth

This civilizational selection for growth manifests in many ways, but most recently it resulted in the rise of the modern financial system. As political entities became more conscious of this growth imperative, and their competition with other entities, they began to consciously build institutions to enhance their ability to grow. The earliest, and least intentional example is that of economic specialization and centralization. Since before the articulation of these principles by Adam Smith, it was understood that specialization was more efficient—when measured in terms of growth—than artesian craftsmanship, and that centralized production that leveraged economy of place better facilitated growth than did distributed production. It was not enough merely to specialize "a little," because the yardstick was not growth per se, but growth in comparison to the growth of competitors. It was necessary to specialize and centralize ever more than competing polities in order to survive. As with previous systems of growth, the agricultural and industrial revolutions were self-reinforcing as nations competed in terms of the size of the infantry armies they could field, the amount of steel for battleships and cannon they could produce, etc. It wasn't possible to reverse course—while it may have been possible for the land area of England, for example, to support its population via either centralized or decentralized agriculture, only centralized agriculture freed a large enough portion of the population to manufacture export goods, military materiel, and to serve in the armed forces.

Similarly, the expansion of credit accelerated the rate of growth—it was no longer necessary to save first buy later when first home loans, then car loans, then consumer credit cards became ever more prevalent, all accelerating at ever-faster rates thanks to the wizardry of complex credit derivatives. This was again a self-supporting cycle: while it is theoretically possible to revert from a buy-now-pay-later system to a save-then-buy system, the transition period would require a significant period of vastly reduced spending—something that would crush today's highly leveraged economies. Not only is it necessary to maintain our current credit structure, but it is necessary to continually expand our ability to consume now and pay later—just as in the peer polity conflicts between stone-age tribes, credit providers race to provide more consumption for less buck in an effort to compete for market share and to create shareholder return. Corporate entities, while existing at least as early as Renaissance Venice, are yet another example of structural bias toward growth: corporate finance is based on attracting investment by promising greater return for shareholder risk than competing corporations, resulting in a structural drive toward the singular goal of growth. And modern systems of quarterly reporting and 24-hour news cycles only exacerbate the already short-term risk horizons of such enterprises.

Why This is Important

This has been a whirlwind tour of the structural bias in hierarchy toward growth, but it has also, by necessity, been a superficial analysis. Books, entire libraries, could be filled with the analysis of this topic. But despite the scope of this topic, it is remarkable that such a simple concept underlies the necessity of growth: within hierarchy, surplus production equates to power, requiring competing entities across all scales to produce ever more surplus—to grow—in order to compete, survive, and prosper. This has, quite literally, Earth shaking ramifications.

We live on a finite planet, and it seems likely that we are nearing the limits of the Earth's ability to support ongoing growth. Even if this limit is still decades or centuries away, there is serious moral hazard in the continuation of growth on a finite planet as it serves merely to push that problem on to our children or grandchildren. Growth cannot continue infinitely on a finite planet. This must seem obvious to many people, but I emphasize the point because we tend to overlook or ignore its significance: the basis of our civilization is fundamentally unsustainable. Our civilization seems to have a knack for pushing the envelope, for finding stop-gap measures to push growth beyond a sustainable level. This is also problematic because the further we are able to inflate this bubble beyond a level that is sustainable indefinitely, the farther we must ultimately fall to return to a sustainable world. This is Civilization's sunk cost: there is serious doubt that our planet can sustain 6+ billion people over the long term, but by drawing a line in the sand, that "a solution that results in the death of millions or billions to return to a sustainable level" is fundamentally impermissible, we merely increase the number that must ultimately die off. Furthermore, while it is theoretically possible to reduce population, as well as other measures of impact on our planet, in a gradual and non-dramatic way (e.g. no die off), the window of opportunity to choose that route is closing. We don't know how fast—but that uncertainty makes this a far more difficult risk management problem (and challenge to political will) than knowing that we have precisely 10, 100, or 1000 years.

This is our ultimate challenge: solve the problem of growth or face the consequences. Growth isn't a problem that can be solved through a new technology--all that does is postpone the inevitable reckoning with the limits of a finite world. Fusion, biofuels, super-efficient solar panels, genetic engineering, nano-tech--these cannot, by definition, solve the problem. Growth is not merely a population problem, and no perfect birth control scheme can fix it, because peer polities will only succeed in reducing population (without being eliminated by those that outbreed them) if they can continue to compete by growing overall power to consumer, produce, and control. All these "solutions" can do is delay and exacerbate the Problem of Growth. Growth isn't a possible problem--it's a guaranteed crisis, we just don't know the exact time-frame.

Is there a solution to the Problem of Growth? Can global governance lead to an agreement to abate or otherwise manage growth effectively? It's theoretically possible, but I see it about as likely as solving war by getting everyone to agree to not fight. Plus, as the constitutional validity and effective power of the Nation-State declines, even if Nation-States manage to all agree to abate growth, they will fail because they are engaged in a very real peer-polity competition with non-state groups that will only use this competitive weakness as a means to establish a more dominant position--and continue growth. Others would argue that collapse is a solution (a topic I have explored in the past), but I now define that more as a resolution. Collapse does nothing to address the causes of Growth, and only results in a set-back for the growth-system. Exhaustion of energy reserves or environmental capacity could hobble the ability of civilization to grow for long periods of time--perhaps even on a geological time scale--but we have no way of knowing for sure that a post-crash civilization will not be just as ragingly growth-oriented as today's civilization, replete with the same or greater negative effects on the environment and the human spirit. Similarly, collapse that leads to extinction is a resolution, not a solution, when viewed from a human perspective.

A solution, at least as I define it, must allow humans to control the negative effects of growth on our environment and our ability to fulfill our ontogeny. The remaining essays in this series will attempt to identify the root cause of the problem of growth, and to propose concrete and implementable solutions that satisfy that definition.

II. Hierarchy is the Result of Dependency

The first section in this essay identified the reason why hierarchal human structures must grow: surplus production equals power, and entities across all scales must compete for this power —must grow—or they will be pushed aside by those who do. But why can't human settlements simply exist as stable, sustainable entities? Why can't a single family or a community simply decide to opt out of this system? The answer: because they are dependent on others to meet their basic needs, and must participate in the broader, hierarchal system in order to fulfill these needs. Dependency, then, is the lifeblood of hierarchy and growth.

Dependency Requires Participation on the Market's Terms

Take, for example, a modern American suburbanite. Her list of dependencies is virtually unending: food, fuel for heat, fuel for transport, electricity, clothing, medical care, just to name a few. She has no meaningful level of self-sufficiency—without participation in hierarchy she would not survive. This relationship is hierarchal because she is subservient to the broader economy —she may have negotiating power with regard to what job she performs at what compensation for what firm, but she does not have negotiating power on the fundamental issue of participating in the market economy on its terms. She must participate to gain access to her fundamental needs—she is dependent (consider also Robert Anton Wilson's notion of money in civilization as "bio-surival tickets").

Compare this to the fundamentally similar situation of family in Lahore, Pakistan, or a farmer in rural Colombia. While their superficial existence and set of material possessions may be strikingly different, they share this common dependency. The Colombian farmer is dependent on a seed company and on revenue from his harvest to fuel his tractor, heat his home, and buy the 90% of his family's diet that he does not grow. The family in Lahore is dependent on the sales from their clothing store to purchase food—they cannot grow it themselves as they live in an apartment in a dense urban environment. They are dependent on participation in hierarchy—they cannot participate on their own terms and select for a stable and leisurely life. The market, as a result of competition between entities at all levels, functions to minimize input costs—if corn can be grown more cheaply in America and shipped to Colombia than it can be grown in Colombia, by a sufficient margin, then that will eventually happen. This requires the Colombian farmer to compete to make his corn as cheap as possible—i.e. to work as long and as hard to maximize his harvest. While if he were participating on his own terms, he may only wish to work 20 hours per week, he may have to work 50, 60, or more hours at hard labor to make enough money off competitively priced corn to be able meet the basic needs of his family in return. He is in competition with his neighbors and competing entities around the world to minimize the input cost of his own efforts—a poor proposition, and one that is forced upon him because he participates on the market's terms, all a result of his dependency on the market to meet his basic needs. The situation of the family of shopkeepers in Pakistan or the Suburban knowledge-worker in America is fundamentally the same, even if it may vary on the surface.

The Blurring of Needs and Wants

Why not just drop out? It isn't that tough to survive as a hermit, gather acorns, grow potatoes on a small plot of forest, or some other means of removing oneself from this dependency on the

market. To begin with, “dropping out” and becoming self-sufficient is not quite as easy as it sounds, and just as importantly, it would become nearly impossible if any significant portion of the population chose that route. But more fundamentally, humans don’t want to drop out of participation in the market because they desire the enhanced consumption that is available—or at least exists in some far-off-promised land called “America” (fantasy even in the mind of most "Americans")—only through such participation. It may be possible to eat worms and acorns and sleep in the bushes, but this would be even more unacceptable than schlepping to work 40+ hours a week. Most people cannot envision, let alone implement, a system that maintains an acceptable “standard of living” without participation in the system, and all but the very lucky or brave few can’t figure out how to participate in that system without being dependent on it.

There is certainly a blurring of “needs” and “wants” in this dependency. Humans don’t “need” very much to remain alive, but a certain amount of discretionary consumption tends to increase the effectiveness of the human machine. From the perspective of the market, this is desirable, but is also an input cost that must be minimized. This is the fundamental problem of participating in the market, the economy, the “system” on its terms: the individual becomes nothing more than an input cost to be minimized in the competition between entities at a higher organizational level. John Robb recently explored this exact issue, but from the perspective of the local community--the implications are quite similar.

In an era of globalization, increased communications connectivity, and (despite the rising costs of energy) an ever increasing global trade network, this marginalization is accelerating at breakneck speed. Is your job something that can be done online from India? How about in person by an illegal immigrant? Because there are people with doctorates willing to work for ¼ what you make if you’re in a knowledge field, and people with high tolerance for mind-numbing, back-breaking labor willing to work hard for $5/hour or less right next door (or for $2/day overseas). If this doesn’t apply to you, you’re one of the lucky few (and, if I might add, you should be working to get yourself to into just such a position). Maybe they don’t know how to outsource your function yet, but trust me, someone is working on it. Participation in the market on its terms means that the market is trying to find a way to make your function cheaper.

This dependency on participation in the hierarchal system fuels the growth of hierarchy. Even if there is a severe depression or collapse, hierarchy will survive the demand destruction because it is necessary to produce and redistribute necessities to people who don’t or can’t produce them themselves. It may be smaller or less complex, but as long as people depend on participation in an outside system—whether that is a local strong man or an international commodities exchange—to gain access to basic necessities, the organization of that system will be hierarchal. And, as a hierarchy, that system will compete with other hierarchies to gain surplus, to grow, and to minimize the cost of human input.

Dependency on a Security Provider

One of the most significant areas in which people are dependent on hierarchal systems is to provide security. This seems to be especially true in times of volatility and change. While it may be possible to set up a fairly self-sufficient farm or commune and provide for one’s basic needs, this sufficiency must still be defended. If everyone doesn’t have access to the necessities that you produce for yourself, then there is potential for conflict. This could range from people willing to use violence to access to your food or water supply to governments or local strong-men expecting your participation in their tax scheme or ideological struggle. Ultimately, dependence on hierarchy is dependence on the blanket of security it provides, no matter how coercive or disagreeable it may be, and even if this security takes the form of “participation” in exchange for

protection from the security provider itself.

Why this is Important

Virtually everyone is dependent on participation in hierarchal systems to meet their basic needs, of one type or another. This dependency forces participation, and drives the perpetual growth —and therefore the ultimate unsustainability—of hierarchy. If growth is the problem, then it is necessary to identify the root cause of that problem so that we may treat the problem itself, and not merely a set of symptoms. In our analysis, we have seen in Part 1 that hierarchies must grow, and now in this installment that human dependency is what sustains these hierarchies. Dependency, then, is the root cause of the problem of growth.

III. Building an Alternative to Hierarchy: Rhizome

So far in this essay, I have argued that competition between hierarchal entities selects for those entities that most efficiently grow and intensify, resulting in a requirement for perpetual growth, and that ongoing human dependency on participation in this system is the lifeblood of this process. At the most basic level, then, an alternative to hierarchy and a solution to the problem of growth must address this issue of dependency. My proposed alternative—what I call "rhizome" —begins at exactly this point.

Achieving Minimal Self-Sufficiency

The first principle of rhizome is that individual nodes—whether that is family units or communities of varying sizes—must be minimally self-sufficient. "Minimally self-sufficient" means the ability to consistently and reliably provide for anything so important that you would be willing to subject yourself to the terms of the hierarchal system in order to get it: food, shelter, heat, medical care, entertainment, etc. It doesn't mean zero trade, asceticism, or "isolationism," but rather the ability to engage in trade and interaction with the broader system when, and only when, it is advantageous to do so. The corollary here is that a minimally self-sufficient system should also produce some surplus that can be exchanged—but only to the extent that is found to be advantageous. A minimally self sufficient family may produce enough of its own food to get by if need be, its own heat and shelter, and enough of some surplus—let's say olive oil—to exchange for additional, quality-of-life-enhancing consumables as it finds advantageous. This principle of minimal self-sufficiency empowers the individual family or community, while allowing the continuation of trade, value-added exchange, and full interaction with the outside world.

It should be immediately apparent that "dependency" is the result of one's definition of "need." Total self-sufficiency in the eyes of a Zimbabwean peasant, even outright luxury, may fall far short of what the average American perceives as "needing" to survive. As a result, an "objectively" self-sufficient American may sell himself into hierarchy to acquire what is perceived as a "need." To this end, what I have called "elegant simplicity" is a critical component of the creation of "minimal self-sufficiency." This is the notion that through conscious design we can meet and exceed our "objective" needs (I define these as largely experiential, not material, and set by our genetic ontogeny, not the global consumer-marketing system) at a level of material consumption that can realistically be provided for on a self-sufficient basis. I've written about this topic on several previous occasions (1 2 3 4 5).

Leveraging "Small-Worlds" Networks

How should rhizome nodes interact? Most modern information processing is handled by large, hierarchal systems that, while capable of digesting and processing huge amounts of information,

incur great inefficiencies in the process. The basic theoretical model for rhizome communication is the fair or festival. This model can be repeated locally and frequently—in the form of dinner parties, barbecues, and reading groups—and can also affect the establishment and continuation of critical weak, dynamic connections in the form of seasonal fairs, holiday festivals, etc. This is known as the "small-worlds" theory of network. It tells us that, while many very close connections may be powerful, the key to flat-topography (i.e. non-hierarchal) communications is a broad and diverse network of distant but weak connections. For example, if you know all of your neighbors well, you will be relatively isolated in the context of information awareness. However, if you also have weak contact with a student in India, a farmer across the country, and your cousin in London, you will have access to the very different set of information immediately available to those people. These weak connections greatly expands information awareness, and leverages a much more powerful information processing network—while none of your neighbors may have experienced a specific event or solved a particular problem before, there is a much greater chance that someone in your diverse and distant "weak network" has.

In high-tech terms, the blogosphere is exactly such a network. While many blogs may focus primarily on cat pictures, there is tremendous potential to use this network as a distributed and non-hierarchal problem solving, information collection, and processing system. In a low-tech, or vastly lower energy world, the periodic fair or festival performs the same function.

Building Rhizome Institutions

The final aspect of the theory of rhizome is the need to create rhizome-creating and rhizome-strengthening institutions. One of these is the ability of rhizome to defend itself. Developments in fourth generation warfare suggest that, now more than ever, it is realistic for a small group or network to effectively challenge the military forces of hierarchy. However, it is not my intent here to delve into the a plan for rhizome military defense—I have explored that topic elsewhere, and strongly recommend John Robb's blog and book "Brave New War" for more on this topic.
One institution that I do wish to explore here is the notion of anthropological self-awareness. It is important that the every participant node in rhizome has an understanding of the theoretical foundation of rhizome, and of the general workings of anthropological systems in general. Without this knowledge, it is very likely that participants will fail to realize the pitfalls of dependency, resulting in a quick slide back to hierarchy. I like to analogize anthropological self-awareness to the characters in the movie "Scream," who were aware of the cliché rules that govern horror movies while actually being in a horror movie. When individual participants understand the rationale behind concepts like minimal self-sufficiency and "small-worlds" network theory, they are far more likely to succeed in consistently turning theory into practice.

Additionally, it is important to recognize the cultural programming that hierarchal systems provide, and to consciously reject and replace parts of this with a myth, taboo, and morality that supports rhizome and discourages hierarchy. Rules are inherently hierarchal—they must be enforced by a superior power, and are not appropriate for governing rhizome. However, normative standards—social norms, taboos, and values—are effective means of coordinating rhizome without resorting to hierarchy. For example, within the context of anthropological self-awareness, it would be considered "wrong" or "taboo" to have slaves, to be a lord of the manor, or to "own" more property than you can reasonably put to sustainable use. This wouldn't be encoded in a set of laws and enforced by a ruling police power, but rather exist as the normative standard, compliance with which is the prerequisite for full participation in the network.

Finally, institutions should be devolutionary rather than accrete hierarchy. One example of this is the Jubilee system—rather than allow debt or excess property beyond what an individual can

use, accumulate, and pass on to following generations--a system that inevitably leads to class divisions and a de facto aristocracy--some ancient cultures would periodically absolve all debt and start fresh, or redistribute land in a one-family-one-farm manner. These specific examples may not apply well to varying circumstances, but the general principles applies: cultural institutions should reinforce decentralization, independence, and rhizome, rather than centralization, dependency, and hierarchy.

Is This Setting the Bar Too High for All?

I'll be the first to admit that this is a tall order. While the current system—massive, interconnected, and nested hierarchies and exchange systems—is anything but simple, its success is not dependent on every participant comprehending how the system works. While rhizome doesn't require completely omniscient knowledge by all participants, the danger of hierarchy lurks in excessive specialization in the knowledge and rationale supporting rhizome—dependency on a select few to comprehend and operate the system is just that: dependency. Is it realistic to expect people to, en masse, understand, adopt, and consistently implement these principles? Yes.

I have no delusions that this is some perfect system that can be spread by airdropped pamphlet and then, one night, a switch is flipped and "rhizome" is the order of the day. Rather, I see this as the conceptual framework for the gradual, incremental, and distributed integration of these ideas into the customized plans of individuals and communities preparing for the future. I have suggested in the past that rhizome should operate on what Antonio Negri has called the "diagonal"-- that is, in parallel but out of phase with the existing, hierarchal system. There may also be lessons to be incorporated from Hakim Bey's notions of the Temporary Autonomous Zone and the Permanent Autonomous Zone—that flying under the radar of hierarchy may be a necessary expedient. Ultimately, this will likely never be a system that is fully adopted by society as a whole—I tend to envision this as analogous, in some ways, to the network of monasteries that retained classical knowledge through the dark in Western Europe after the fall of the Roman Empire. In a low-energy future, it may be enough to have a small rhizome network operating in parallel to, but separated from, the remnants of modern civilization. Whether we experience a fast crash, a slow collapse, the rise of a neo-feudal/neo-fascist system, or something else, an extant rhizome network may act as a check on the ability of that system to exploit and marginalize the individual. If rhizome is too successful, too threatening to that system it may be imperiled, but if it is a "competitor" in the sense that it sets a floor and for how much hierarchal systems can abuse humanity, if it provides a viable alternative model, that may be enough to check hierarchy and achieve sustainability and human fulfillment. And, if this is all no more than wishful thinking, it may provide a refuge while Rome burns.

IV. Implementing Rhizome at the Personal Level

Rhizome begins at the personal level, with a conscious attempt to understand anthropological processes, to build minimal self-sufficiency, and to engage in "small-worlds" networks. This installment will outline my ideas for implementing this theory at the personal level in an incremental and practicable way. This is by no means intended to be an exhaustive list of ideas, but rather a starting point for discussion:

Water

In the 21st Century, I think it will become clear that water is our most critical resource. We'll move past our reliance on oil and fossil fuels—more by the necessity of resorting to dramatically lower consumption of localized energy—but we can't move beyond our need for water. There is no substitute, so efficiency of use and efficacy of collection are our only options. In parts of the world,

water is not a pressing concern. However, due to the fundamental and non-substitutable need for water everywhere, creating a consistent and resilient water supply should be a top priority everywhere. Climate change, or even just periodic extreme drought such as has recently hit the Atlanta area, may suddenly endanger water supplies that today may be considered a "sure thing." How does the individual do this? I think that four elements are crucial: efficient use, resilient collection systems, purification, and sufficient storage.

Efficient use is the best way to maximize any available water supply, and the means to achieve this are varied: composting (no-flush) toilets, low-flow shower heads, mulching in the garden, etc. Greywater systems (also spelled "graywater," various spellings seem popular, so search on both) that reuse domestic water use in the garden are another critical way to improve efficiency.

Resilient collection systems are also critical. Rainwater harvesting is the best way to meet individual minimal self-sufficiency—dependence on a shared aquifer, on a municipal supply system, or on a riparian source makes your water supply dependent on the actions of others. Rainwater falling on your property is not (at least arguably not) dependent on others, and it can provide enough water to meet minimal needs of a house and garden in even the most parched regions with sufficient planning and storage. There are many excellent resources on rainwater harvesting, but I think Brad Lancaster's series is the best—-buy it, read it, and implement his ideas.

While dirty water may be fine for gardens, water purification may be necessary for drinking. Even if an existing water supply doesn't require purification, the knowledge and ability to purify enough water for personal use with a solar still or via some other method enhances resiliency in the face of unforeseen events.

Storage is also critical. Rain, fortunately, does not fall continuously—it comes in very erratic and unpredictable doses. Conventional wisdom would have said that long-term storage wasn't necessary in the Atlanta area because rain falls so regularly all year round that storage of only a few months supply would suffice. Recent events proved this wrong. Other areas depend on short, annual monsoon seasons for the vast majority of their rain (such as Arizona). Here, storage of at least one year's water supply is a threshold for self-sufficiency, and more is desirable. Significant droughts and erratic rainfall mean the more storage the better—if you don't have enough storage to deal with a drought that halves rainfall for two straight years, then you are forced back to dependency in such an event at exactly the worst time, when everyone else is also facing scarcity. Where to store water? The options here are also varied—cisterns are an obvious source for drinking water, as are ponds where it is a realistic option, but storage in the ground via swales and mulch is a key part of ensuring the water supply to a garden.

Food

If you have enough water and land, it should be possible to grow enough food to provide for minimal self-sufficiency. While many people consider this both unrealistic and extreme, I think it is neither. Even staunchly "establishment" thinkers such as the former chief of Global Strategy for Morgan Stanley advise exactly this path in light of the uncertainty facing humanity. There are several excellent approaches to creating individual food self-sufficiency: Permaculture (see Bill Mollison's "Permaculture: A Designer's Manual"), Masanobu Fukuoka's "Natural Way of Farming" (see book of the same name), Hart's "Food Forests," and John Jeavons' "Biointensive Method" (see "How to Grow More Vegetables"). Some combination and modification of these ideas will work in your circumstances. It is possible to grow enough calories to meet an individual's requirements in only a few thousand square feet of raised beds—a possibility on even smaller suburban lots, and I have written about the ability to provide a culinarily satisfying diet

on as little as 1/3 acre per person.

An additional consideration here is the need to make food supplies resilient in the face of unknown events. I have written about exactly this topic in "Creating Resiliency in Horticulture", which basically advises to hedge failure of one type of food production with others that are unlikely to fail simultaneously—e.g. balance vegetable gardens with tree-crop production, mix animal production with the availability of reserve rangeland, or include a reserve of land for gathering wild foods. In Crete, after World War II, while massive starvation was wreaking Greece, the locals reverted to harvesting nutritious greens from surrounding forests to survive. The right mix to achieve food resiliency will vary everywhere—the key is to consciously consider and address the issue for your situation.

Shelter, Heating, & Cooling

Shelter should be designed to reduce or eliminate outside energy inputs for heating and cooling. This is possible even in the most extreme climates. Shelter should also be designed to eliminate reliance on building or maintenance materials that can't be provided in a local and sustainable fashion. I realize that this is a challenge—but our architectural choices speak just as loudly about our real lifestyle as our food choices. Often, studying the architectural choices of pre-industrial people living in your region, or in a climatically similar region, provides great insight into locally appropriate architectural approaches. Passive solar heating and cooling is possible, with the right design, in virtually any climate—something that I have written about elsewhere.

Defense

I'm not going to advocate that individuals set up their own private, defensible bunker stocked with long rifles, claymore mines, and cases of ammunition. If that's your thing, great. I do think that owning one or more guns may be a good idea for several reasons—defense being only one (hunting, good store of value, etc.). Let's face facts: if you get to the point that you need to use, or threaten to use a lethal weapon to defend yourself, you're A) already in serious trouble, and B) have probably made some avoidable mistakes along the way. The single best form of defense that is available to the individual is to ensure that your community is largely self-sufficient, and is composed of individuals who are largely self-sufficient. The entirety of part five of this series will address exactly that topic. Hopefully, America will never get to the point where lethal force must be used to protect your garden, but let's face it, large parts of the world are already there. In either case, the single best defense is a community composed of connected but individually self-reliant individuals—this is rhizome. If your neighbors don't need to raid your garden or "borrow" your possessions, then any outside threat to the community is a galvanizing force.

For now, aside from building a resilient community, there are a few things that individuals can do to defend their resiliency. First, don't stand out. Hakim Bey's notion of the permanent autonomous zone depends largely on staying "off the map." How this manifests in individual circumstances will vary wildly. Second, ensure that your base of self-sufficiency is broad and minimally portable. At the risk of seeming like some wild-eyed "Mad Max" doom-monger, brigands can much more easily cart off wealth in the form of sheep or bags of cracked corn than they can in the form of almond trees, bee hives, or a well-stocked pond. Just think through how you achieve your self-sufficiency, and how vulnerable the entire system is to a single shock, a single thief, etc. You don't have to believe that there will ever be roaming bands of brigands to consider this strategy—it applies equally well to floods, fire, drought, pestilence, climate change, hyperinflation, etc. My article "Creating Resiliency in Horticulture" also addresses this point.

Medicine, Entertainment, & Education

You don't need to know how to remove your own appendix or perform open heart surgery. You don't need to become a Tony-award caliber actor to perform for your neighbors. You don't need to get a doctorate in every conceivable field for the education of your children. But if you understand basic first aid, if you can hold a conversation or tell a story, if you have a small but broad library of non-fiction and reference books, you're a step ahead. Can you cook a good meal and entertain your friends? Look, human quality of life depends on more than just the ability to meet basic caloric and temperature requirements. The idea of rhizome is not to create a bunch of people scraping by with the bare necessities. Having enough food is great—you could probably buy enough beans right now to last you the next 10 years, but I don't want to live that way. Most Americans depend on our economy to provide us a notion of quality of life—eating out, watching movies, buying cheap consumables. Minimal self-sufficiency means that we need the ability to provide these quality of life elements on our own. This probably sounds ridiculous to people in the third world who already do this—or to the lucky few in the "West" who have regular family meals, who enjoy quality home cooking, who can carry on enlightening and entertaining conversations for hours, who can just relax and enjoy the simplicity of sitting in the garden. It may sound silly to some, but for others this will be the single, most challenging dependency to eliminate. Again —dependency is the key. I'm not saying that you can never watch E! or go out to Applebee's. What I am saying is that if you are so dependent on this method of achieving "quality of life" that you will enter the hierarchal system on its terms to access it, you have not achieved minimal self-sufficiency.

Production for Exchange

Finally, beyond minimal self sufficiency, the individual node should have the capability to produce some surplus for exchange because this allows access to additional quality-of-life creating products and services beyond what a single node can realistically provide entirely for itself. This is the point where minimal self-sufficiency doesn't require isolationism. It is neither possible nor desirable for an individual or family node to provide absolutely everything desired for an optimal quality of life. While minimal self-sufficiency is essential, it is not essential to produce independently every food product, every tool, every type of entertainment, every service that you will want. Once minimal self-sufficiency is achieved, the ability to exchange a surplus product on a discretionary basis allows the individual node to access the myriad of wants—but not needs —that improve quality of life. This surplus product may be a food item—maybe you have 30 chickens and exchange the extra dozen or two eggs that you don't consumer on a daily basis. Maybe you make wine, olive oil, baked bread, or canned vegetables. Maybe you provide a service —medicine, childcare & education, massage, who knows? The possibilities are endless, but the concept is important.

Practical Considerations in Implementing Rhizome at the Personal Level

Rhizome isn't an all or nothing proposition—it is possible, and probably both necessary and desirable, to take incremental, consistent steps toward rhizome. Learn how to do more with less. Work to consciously integrate the principles of rhizome into every aspect of your daily life—think about your choices in consumption, then make medium and long-term plans to take bigger steps towards the full realization of rhizome.

And, perhaps most of all, rhizome does not demand, or even endorse, a "bunker mentality." The single greatest step that an individual can take toward rhizome is to become an active participant in the creation of rhizome in the immediate, local community.

V. Implementing Rhizome at the Community Level

This final essay in this five-part series, The Problem of Growth, looks at implementing rhizome at a community level. Rhizome does not reject community structures in favor of a "bunker mentality," but rather requires community structures that embrace and facilitate the principles of rhizome at both the personal and community level. Ultimately a rhizome community is composed of rhizome individual or family nodes—participants who do not depend on the community for their basic survival, nor participants who expect to benefit from the community without contribution. Rather, both the individual and the community choose to participate with each other as equals in a non-zero-sum fashion.

The results-based focus of the community is essentially the same as the individual, because the community consists of individuals who recognize the ability of the community to help them build resiliency and self-sufficiency in the provision of their basic needs, as well as the ability to access a broader network beyond the community.

Water

The first thing that communities can do is to get out of the way of individuals' attempts to create water self-sufficiency: remove zoning and ordinance hurdles that prevent people from practicing rainwater collection and storage, or that mandate people keep their front lawns watered. Communities can also address their storm water policies—many communities simply direct storm water into the ocean (see Los Angeles, for example), rather than effectively storing it in percolation ponds, or otherwise retaining it for community use. Communities can also facilitate the collection and sharing of water-collection and efficiency best practices, as well as help people to refine ideas from outside the community in a locally-appropriate manner. The possibilities are endless—as with virtually everything else here, the key is that the community recognize the issue and make a conscious effort to address it.

Food

Again, communities should start by getting out of the way of individuals' attempts to become food self-sufficient. This means eliminating zoning or ordinances that require lawns instead of vegetable gardens, that prevent the owning of small livestock such as chickens in suburban developments, and even (!) that mandate the planting of non-fruit bearing trees (on the theory that they're messy if you forget to harvest them). But communities can also have a very proactive role in facilitating food self-sufficiency. Community gardens are a great place to start, especially where people live in high density housing that makes individual gardening impracticable. This has been done to great effect in urban areas in Venezuela, for instance. Communities can also foster knowledge and facilitate the sharing of best practices via lecture series, master gardener courses, local gardening extensions, community college courses, or community seek banks for locally appropriate species. Finally, communities should consider encouraging farmers markets to promote local surplus produce, to promote at least regional food self-sufficiency, and to kindle a public appreciation for the quality and value of fresh, seasonal, locally grown foods.

Shelter, Heating, & Cooling

I see the actual implementation of self-sufficient shelters as primarily an individual concern, though communities should certainly consider making communal structure, schools, etc. that conform to these standards. Most significantly, however, communities can work to get government out of the way of people who wish to do so individually. Get rid of zoning requirements that forbid solar installations, graywater, rainwater catchment, or small livestock,

or that mandate set-backs and minimum numbers of parking spaces. Pass laws or ordinances that eliminate Home Owners' Association rules prohibiting vegetable gardens, that mandate lawns, that prevent solar installations, etc. Many Colorado Home Owners' Associations (HOAs) used to ban the installation of solar panels, but Colorado recently passed a statute that prevents HOAs from banning solar—seems like a good idea to me. The Colorado law certainly isn't perfect, but it is an example of a very real step that a few people can take to work with their local or state government to help make your community more self-sufficient. If your HOA prevents you from installing solar hot water (or other solar), why not try to get the HOA to change its rules--there may be many other neighbors who want the same thing, and the more self-sufficient your immediate neighbors, the stronger your community, even if that community is "suburbia." If your HOA won't change, follow Colorado's example.

Defense

As with individual defense, I don't advocate that a community take a bunker mentality and make preparations for a Hizb'Allah style defense of South Lebanon. I think that could work, and I've written about it here, but I think it is the second to worst outcome and something to be avoided if possible. In modern America, it seems obvious to me that it is fully possible for a rhizome community to operate within the umbrella of any current state government, as well as the federal government. However, there are other nations—take Colombia for example—where this is probably not possible. It seems like a very real possibility that the permissive environment America currently enjoys could look much more like Colombia at some point in the future. For that reason, this is an issue that must be taken up on a case-by-case basis by local communities. While I certainly wouldn't advocate an armed militia patrolling the perimeter of the self-sufficiency conscious town of Willits, California (though some American communities effectively do this already), this kind of "extreme" action may well be a basic requirement for a small village in Colombia that is attempting to institute localized self-sufficiency and rhizome structure.

Medicine, Entertainment, & Education

Communities have a myriad of ways to provide for their own entertainment, without resorting to some canned cable-TV product. Also, communities can address the specialized knowledge problems—education and medicine, as well as gardening, and the theory of rhizome, by ensuring that these topics are covered in local school curriculums at all levels (public and private), by making these kinds of learning resources available via a community college, the local library, a lecture series, etc.

Exchange, Information Processing, and Interaction Beyond the Local Community

The possibilities here are numerous, and I'll just name a few possibilities for consideration: Community currency, community paper or blog, community development micro-loans, sponsoring seasonal fairs or festivals, etc. This is an area ripe for innovation and the sharing of best-practices...for additional ideas, see "Going Local" by Michael Schuman.

Practical Considerations in Implementing Rhizome at the Community Level

Just as with implementing rhizome at the individual level, rhizome is not an all-or-nothing proposition for communities. Any step that makes it easier for individuals to move toward rhizome is beneficial. Every community's situation is different, and the number of ways to combine just the few suggestions provided here is nearly limitless. Customize, come up with new solutions, adapt or reject these ideas as you see fit, and share what works (best practices) and what doesn't with the world in an open-source manner—but more than anything else, think about

how to bring your community closer to rhizome, and then act.

Addressing Free-Riders

Finally, every community must address the problem of free riders. Some people will want to benefit from the community without contributing anything at all. In most cases, normative pressures will suffice, and this is especially true of rhizome, where there isn't a grand redistributive scheme that facilitates some people to leach indefinitely off the collected surplus. Still, the problem will arise, and there will always be a need and a place for charity, within rhizome and elsewhere. The most important factor in determining who is worthy of charity and who is a free-rider is the conscious articulation of the requirements for membership: the community gains strength by helping up its least self-sufficient members, but it should do so by helping them to fish, rather than repeatedly just giving them fish to eat. Rhizome communities need not be heartless—in fact, they shouldn't be heartless, not just on moral grounds, but on selfish grounds of building a more resilient community—but they should exert normative pressures to demand participation roughly commensurate with capability.

VI. Conclusion

I hope that this five-part series addressing the Problem of Growth has been useful. One of the cornerstones of my personal philosophy is that growth is the greatest challenge facing humanity, and that shifting from a hierarchal to a rhizome form of social organization is our best chance to "solve" that problem. I also think that rhizome is valuable as it is a scale-free solution: I think that it can help to solve our international and national problems, but even if that fails it can certainly improve our individual situations. Ultimately, removing ourselves, one at a time, from being part of the cause of humanities problem cannot be a bad thing. As Ghandi said, "be the change that you wish to see in this world." That seems particularly applicable to a scale-free solution!
I think that this discussion is particularly relevant within the context of Peak Oil and Peak Energy.

Infinite growth requires, eventually, infinite energy. Assume that we develop a perfect fusion generator, or that we cover the entire surface of the Earth with 100% efficient solar collectors. None of this actually solves the problem of growth—it just shifts the burden of dealing with that problem onto our grandchildren, or perhaps even 100 generations from now. It's easy to take the self-centered perspective that such burden-shifting is acceptable, but I find it fundamentally morally unacceptable. This (rather long) essay begins with that moral assumption—if you don't share it, then you will likely have found a preferable solution, or perhaps denied that growth even represents a problem to begin with. That's fine by me—I am trying to present one possible solution without claiming that it is the only possible solution. I hope you have found it useful.

The original five parts of this essay can be found here.