

SCIENCE, TECHNOLOGY, & SOCIETY

As a society with such a strong emphasis on technological advancement, we are compelled to be responsible in our implementations of emerging technologies so that we can fully appreciate the impact that the changes we make will have on our lives.

This essay aims to address these issues, amongst others. Through the course of this paper, I will specify five concrete goals for a commendable technological civilization. I will describe, in terms of these goals, what is going both right and wrong with technological innovation and use. To the extent that there are problems, I will attempt to identify the main causes in accordance with the readings I have studied. I will then propose three steps to advocate the acceleration of sociotechnical change toward the goals I favor, while slowing down and averting sociotechnical change going in the directions I do not favor. Finally, I will address how a re-engineering of institutions could create conditions that provide incentives for a more robust, balanced, and representative civilization.

GOALS FOR A COMMENDABLE TECHNOLOGICAL CIVILIZATION

Leisure time and product safety, as well as other indirect societal effects, are some of the issues raised by discussions about the impacts of technology. We have seen that technology can significantly impact these areas of our lives, but we are forced to decide when the costs incurred to these parts of our lives outweigh the benefits. Juliet Schor, in her article entitled “Technology, Work, and Leisure,” makes reference to the American sleep deficit – that is, that a majority of our citizens are sleeping up to 90 minutes less than is optimal for healthy living. With shift work, long working hours, and the “24 hour business culture,” the accelerating pace of life has led us to sacrifice our personal time in lieu of a commitment to work. We see ourselves as highly advanced, and American nationalism is certainly

seen throughout the world – yet at the same time, in contrast to the statistics noted in Akash Kapur’s article regarding our ‘prosperity’ as defined by our gross domestic product per-capita, there is certainly strong evidence that our true prosperity is paradoxically not financial in nature.

A child in a ‘poor’ country by our standards surely faces hardships as well, but the hectic way of life we have espoused induces its own cause for stress. Referring to Schor’s note that “holiday leisure time in medieval England took up probably about one-third of the year,” it should also be noted that this was probably a product of seasonal requirements for varying amounts of labor (giving rise to celebrations such as Oktoberfest in Germany occurring after the harvesting ended). We have no such ‘rhythm’ to our lives. We instead operate on reflexes – even in this class, we reflexively lose points and thus hurt our grade by failing to complete assignments, yet our assignments are provided one after another. And, because students here hopefully seek the best employment possible after graduation, we all participate in the cycle. With our insatiable cultural desire for instant gratification, we have developed numerous institutions that ensure that we make the best available use of our precious time. The first goal for a commendable technological society is to increase emphasis on leisure time and create laws similar to those existing in France that regulate the maximum number of hours per week an employer can require an employee to work. Consider, on the note of leisure time, the effort expended in cooking a hamburger, from buying the meat at the supermarket, to cooking the meat, to serving the burger itself, to finally cleaning the silverware afterwards: if we decided culturally that this traditional approach to sustenance was appropriate, than we would have no need for McDonalds.

Certainly, our goals in the implementation of the deep-fryer or ‘assembly line’ cooking technologies were not to broadly detract from the

health of our populace or to reinforce the trend of declining leisure time. In this way, these consequences are secondary consequences to the primary consequence of increased availability of foodstuffs. To this end, we must examine what secondary and tertiary consequences result from more complex technologies. Therefore, as a society it is our responsibility to ensure that we reject technologies that have unintended undesirable costs associated with them.

No culture better understands this need for careful evaluation than the Amish. The Amish see a divide between innovation and acceptance of technology, and forcibly reject technologies whose uses detract from their way of life or otherwise are seen as a threat to their primarily agrarian culture. In terms of our responsibility to reject technologies that are detrimental, we too can analyze what is right and wrong about the technologies we adopt in order to protect ourselves from being put in a position where our systems intentionally or unintentionally possess a power over us, as discussed in Langdon Winner's article.

Ironically, the Amish have experimented with the cultural assimilation of cellular telephones. "Does it bring us together, or draw us apart," is the question asked by the Amish bishops before opting to approve the use of a technology. Yet, the Amish culture is not authoritarian in its rejection of culture. The article anecdotally describes how one particular man had used a cell phone for years because of his business. In this way, new technology is not outright rejected. Rheingold writes, "New things are not outright forbidden, nor is there a rush to judgment. Rather, technologies filter in when one of the more daring members of the community starts to use [...] something new." This cautious but not inhibiting approach to innovation seems especially appropriate in light of news that some of our emerging inventions may be harmful to us – such as nanotechnology. Thus the second goal for a commendable technological society is to provide specific incentives such as tax breaks to corporations that take time to objectively evaluate

the consequences of their products and take proactive steps to mitigate harmful consequences of their products.

However, though some Amish communities find the cellular telephone to be a boon rather than a burden, it is my opinion that because our culture embodies 'essential' electronic articles such as these, that we in fact have had the same effect caused to us culturally that the automobile had in the 1960s to the Amish – "decreasing the social cohesion." We answer our cellular phones compulsively as we operate our automobiles because of the social pressures to do so. We surf the web when we should be focused in class simply because we have the capability to access the outside world in an instant. It is thus no surprise that the automobile was considered to be harmful to social order in these communities. Today, in particular, we are all but forced to sign up for AOL® Instant Messenger and "The Face Book," because our friends seem to all choose to. Yet, why is it that we desire to network with our friends via a computer keyboard rather than in person?

Additionally, what about technologies whose impact is not something that can be qualitatively described by sociologists? What about technologies having quantitative impacts on our way of life, such as mechanized cattle ranching and nanotechnology? The Amish way of life effectively immunizes them from dangerous diseases such as CJD. Whereas we consciously choose to consume products that are not grown organically but rather mechanically, the Amish prefer to reject the technologies providing for enhanced cattle feeding at a higher immediate cost in terms of time investment. When Michael Gregor describes the plight of those who actually were diagnosed with CJD, we should at least ask ourselves – even if we are hungry, are we willing to be better fed at the risk of "a living nightmare of terrifying hallucinations"? While it should be noted that I in fact am not vegetarian, and that I do not agree with the author regarding the *relative* safety of our food supply, I do agree that "until the federal government stops the feeding of

slaughterhouse waste, manure, and blood to all farm animals, the safety of meat in America cannot be guaranteed.”

The third goal of a commendable technological society is to ensure the safety of its food stocks, accomplished not with sweeping mandate requiring farmers to change their ways, but rather by using market mechanisms such as subsidies to encourage the mass production of organically grown grains, fruits, and vegetables, as well as organically fed meats. An interesting side effect of subsidies such as this is that if local growers are encouraged to feed their own communities, the need to transport and store the food before it is consumed is eliminated or at least substantially reduced. This would significantly lower the amount of energy expended to move eighteen-wheelers loaded with produce from farms to cities, as well as the cost to refrigerate or store that produce in the meantime before it's purchased. Less trucks on the road also means less wear on the roads, as trucks are the largest contributor to roadway fatigue (as opposed to cars).

A fourth goal for a commendable technological society would include legislation similar to that of Germany requiring manufacturers to embody “cradle to cradle” policies regarding the products they produce. This would need to be mandated federally, of course, and tariffs would have to be imposed on imports to recover the costs of disposal for imported goods. Finally, legislation should be introduced that would provide for liability to natural capital for corporations. For example, say someone owned land adjacent to a factory, and the land owner in question was downstream of some factory (assuming a stream ran through both properties). If the land owner could demonstrate that there was a loss of natural capital as a result of toxic contamination, soil abuse, or some other event within the corporation's control, the corporation should be held strictly liable for all direct and indirect damages resulting from their actions. We should place liability on inefficiency

instead of just insufficiency in industry (Hawken, 91).

WHAT IS GOING RIGHT AND WRONG WITH INNOVATION?

In so many ways, our technologies have taken us so far. We have immunizations that have indisputably saved an innumerable amount of people, we have technologies to deliver drugs and treat cancers, and we even can travel into space. We are able to exchange information at light speed across continents, providing the potential for infinite inter-exchange between different cultures. Ignoring the shortcomings of nanotechnology (for the sake of argument), consider the potential benefits as listed by the Center for Responsible Nanotechnology: pure drinking water, cheap greenhouses, cheap solar energy, increased computing power, improved medicinal technology. Certainly we cannot ignore the fact that some technologies do indeed bring us to a state at which we are better than before.

The ability to recognize the problem, however, is not as important as the ability to recognize the source of the problem. When technologies hurt us, it is often indirect. For the moment, let us consider instead a particular use of technology that directly led to injury. As with all things corporate, every business decision is weighed (at some level) by its costs and benefits. When a decision is more costly than it is beneficial, pressures from stock holders and stakeholders force corporate executives to directly address the problem and re-tool their company to make things profitable once again. Reflect on the Ford Pinto incident – according to Mark Dowie, “Ford successfully lobbied, with extraordinary vigor and some blatant lies, against a key government safety standard that would have forced the company to change the Pinto's fire-prone gas tank.” But why filibuster government legislation with a patently good-natured intent? “Ford waited eight years because it's internal ‘cost-benefit analysis,’ which places a dollar value on human life, said it wasn't profitable to make

the changes sooner.” Certainly, economics played a considerable role here. The blame does not fall on an individual in this case, but rather is distributed because pressures from stock holders demand profit, while pressures from engineers and the public at large demand safety. As with everything in life, it is the point at which the two conflicting stances meet that determines history. Economically, the automobile has had a more positive than negative impact. There are plenty of jobs in manufacturing of the automobile itself, maintenance of the automobile, selling insurance policies to cover liability of operating an automobile, constructing and policing the highways – and the list goes on. Thus, arguably, the automobile has not necessarily been completely a harm to our culture (especially not economically), but has certainly also hurt us in a number of ways because of the economic pressures associated with it.

But, on this note, Paul Hawken cites an incredible number of technologies that could be integrated into automobiles that would have little to no impact on drivers directly but would reap massive societal and environmental benefits. Electric engines for example can convert upwards of 90% of the energy they create into traction, and even recoup some driving energy normally lost during braking through regenerative braking (Hawken, 25). Automobile manufacturers drag their feet to keep from retooling their factories claiming that steel is the most cost effective material to use, meanwhile, history has shown that there have been many materials and parts that were displaced by other much better parts, as was the case with the Pinto’s gas tank (Hawken, 30). Yet still we ignore the possibility of a “rust free, fatigue free, non-chipping, nearly un-dentable composite body [that] would last for decades until it was eventually recycled,” (Hawken, 38) in favor of the less immediately expensive alternative, steel. Such is often the case: it is a cultural norm to consume at the lowest cost possible, and this concept is reflected not only in our homes but in professional fields like engineering and international business. Take the

example of the fluorescent light bulb: few people will pay fifteen to twenty dollars for an efficient light bulb when an ordinary one sells for fifty cents, despite the advantages of the more efficient bulbs (Hawken, 269).

Indeed, political pressures often are a major driving force when considering why we often choose to accept problems with technologies rather than wait for issues to be resolved. Lawmakers are eager to legislate, even when there is no necessary need for new legislation – for example, the designation of official state birds or state songs, when other looming social problems exist. Politicians are particularly concerned with the future of their political career. A politician that affects no change is a lame duck merely waiting to be voted out. George Marshall and Mark Lynas wrote jokingly, about assigning blame, “The south blames the north, cyclists blame car drivers, and almost everyone blames George Bush.” But more seriously, they note that “85 percent of the British public say they are concerned about climate change [yet] domestic energy consumption still rises by 2 per cent per year, cars get bigger, and people boast of their holidays to ever-more-distant resorts.” The point to illustrate here is that even though we may believe that we are truly concerned about these issues, we choose not to focus on them because of the reality that the costs imposed by restructuring our society are too great. No politician that was seriously concerned with their career would dare introduce legislation to ban the use of automobiles, or for that matter even coal energy, because of their positive direct or indirect contributions to our daily lives. Politicians are afraid to ‘bite the bullet’ and enact socially responsible legislation in these regards because they fear the repercussions of their actions and do not want to be blamed. Japan is far more progressive in this sense, as it has already enacted legislation that makes it undesirable to own an automobile that has an unnecessarily large engine. This was not achieved via elected officials however, as it actually came hidden as a change in tax code that imposed a stiff tax liability on car

owners that purchased new vehicles that were simply not small enough for the governments liking.

This is not to say that there are no forward-thinking politicians in the world. New York, for example, has a program called DSIRE that places incentives on the use of renewable energy and provides tax breaks on green construction. Such benefits are especially critical to establishing a homeostatic relationship with the Earth. This makes it practical for contractors to use technologies like “super-windows”, which cost about ten percent more to purchase but insulate eight times as well (Hawken, 98). Considering the statistic that the United States has unnecessarily allocated about \$1 *trillion* in capital into air conditioning equipment (Hawken, 91), it’s remarkable that there have been no fixes introduced to relieve this unnecessary material usage and energy consumption. It is these hidden costs that must be accounted for in order to minimize the impact that our society imposes on the planet.

WHAT CAUSES THE PROBLEMS WE FACE?

As the saying goes, those who do not learn from the past are condemned to relive it. In many ways, even in learning the past, we still ignore it. It can take centuries to effect real change of what we as a culture believe collectively.

Hawken points out that the global economy is only about ten percent efficient, and that this incredible waste is rewarded by “deliberate distortions in the marketplace, in the form of policies like subsidies to industries that extract raw materials from the earth and damage the biosphere.” (Hawken, 15) This is a result of the fact that we still rely on traditional ways of thinking that place emphasis on possession of some material or good as the most central form of wealth. Hawken says, “Governments from developed and developing nations still use accounting methods that register the fish and the coral harvest as net gains rather than net losses.”

(Hawken, 156) A new way of thinking focusing on natural capital certainly could not hurt, since the very premise is to merely account for the consequences to the earth of the actions we take. Still, it would be difficult for a sociologist to tell an accountant how to do their job. Appraisers, for example, rarely place any value on attributes embodied by green buildings.

The harm that this type of accounting does is demonstrated in the irony of the role of an energy manager at some corporations. The function of the energy manager is to reduce energy consumption, a goal with long term visions. Yet, paradoxically, “The energy managers can’t buy equipment that yields anything beyond a six-month payback.” (Hawken, 268) Multiple examples cited in *Natural Capitalism* demonstrate the long term benefits of the responsible choices that we make today. In many ways, the book merely argues that a little bit of foresight is required. Certainly, no business person would reject that concept at face value. Yet still, the idea that the true cost of an item is associated with its price tag pervades our society no matter how antiquated it may be.

Perhaps another reason that there have not yet been changes enacted in our society is that the people that are in charge consider availability of raw energy to be reason enough to go to war. “Whether it involves oil or water, cobalt or fish, access to resources is playing an ever more prominent role in generating conflict.” (Hawken, 19) Anti-war protests prior to the United State’s invasion of Iraq screamed of this – “No blood for oil,” many signs read. My cousin, Pfc. Michael Arciola, died in Iraq in late February of this year during an exchange of small arms fire with insurgents. He was shot in the neck, and died before he could receive any medical care. I may never be able to fully appreciate the things he did overseas, but there are some things that I can plainly see. Halliburton, the contractor awarded the \$87 billion reconstruction contract (without submitting an open bid) lists oil and gas exploration and production as one of its primary industry codes according to Hoovers.

Considering that average pay for our a GI is under \$20,000 a year according to CNN Money, it's astounding to realize that guards protecting Halliburton's new Iraqi oil fields are being paid upwards of \$80,000 a year. Though we may fight for energy, this still is not justification to consume the energy. Would it not have sufficed to reduce reliance on foreign energy by promoting reduced consumption or increased efficiency? The energy crisis of the 1970s certainly shocked our economy enough to spur changes as small as leaving lights off when a room is empty. Is it just easier to fight with nations that lack the military industrial complex that we have? Even if it is easy, is it right?

Or, along these lines, consider the National Electric Code (NEC). The NEC was drafted with the intent of preventing electrical fires – wires that are too small generate heat which can then lead to combustion. Smaller wires also cost less to produce because they are less materially intensive. But the smallest wire size necessary is not the most economical choice when considering factors other than cost. In a typical office lighting circuit, one wire gauge size higher than the NEC specifies often yields about a 193% per year after tax return on its additional cost (Hawken, 274). Why not use these fatter wires than? Simply because our contractual bidding process is based solely on immediate cost, and thus the lowest bidder would be wise to use the smallest wire gauge possible to save on contractor costs. This illustrates a “split incentive” in which consumers would be better suited with larger wires, yet contractors would be more likely to profit from using smaller wires.

Our society has a perverse sense of efficiency. Consider the system of air travel: our air travel systems are so riddled with waste, or *muda*, that Professor Daniel Jones once found “nearly half the door-to-door time of a typical intra-European air trip to have been spent in ten different lines, seven baggage-handling operations, eight inspections asking the same questions, and twenty-three processing steps performed by nineteen organizations.” (Hawken,

126) Hawken cites monopolistic behaviors on part of the airlines as the cause of this, and so really this monopoly should be dissolved under antitrust laws because of the incredible amount of capital (both natural and classic) that are wasted. Still, the system could be so much better. Professor Jones also remarked, “To hell with your competitors; compete against *perfection* by identifying all activities that are *muda* and eliminating them.” (Hawken, 133) If we don't strive to make our processes perfect, they certainly will not be.

THREE STEPS TO A BETTER SOCIOTECHNICAL SYSTEM

Intelligent taxation and subsidization will be critical to directing us to a new economic model. At the time Natural Capitalism was written, there was no legislation proposing a consumption tax anywhere in congress. Today, the ubiquitous economist Alan Greenspan favors a consumption tax (Fox News). It is essential that we ensure that such a system is fully developed. We must discourage unnecessary consumption and encourage innovation. We must move away from our current system that does not adequately assess penalties to those damaging our natural capital. The taxes that we do levy should be fair and the use of the tax should be straightforward and honest. A tax on heavy vehicles should be used to fund research into *hypercar* materials and engines or alternate methods of mass transit. The taxes on gasoline should be reformed so as to accurately bill consumers for the costs associated with the internal combustion engine. Also, the tax should be used to fund a general insurance fund that would indemnify driver's liability (to replace the current system in which some drivers illegally drive without insurance and end up causing damages). The tax code itself should also be restructured to be easier to understand for individuals and sole proprietor type businesses, allowing human capital to be better allocated elsewhere.

Intelligent material and energy consumption is the next critical feature of a responsible technological society. We should not tolerate the rampant wastes in our society. An excise tax should be levied on air conditioners, to begin with. This should have been done intuitively after the northeastern blackout of 2004. This will encourage the use of better building materials which will have other positive consequences. Energy consumption will be lower during the winter as well, not to mention the reduced energy used forming the building materials, as well as the energy saved in simply not constructing, shipping, or installing the air conditioners at all. Furthermore, building codes should be revised to require the installation of infrared motion sensors in certain types of lighting circuits. Many lights are not needed when no one is present. Closet lights, for example, need not remain lit when there is no person inside the closet. This could also apply to bathroom lights, garage lights, and laundry room lights. This would also reduce the likelihood of a fire, as most incandescent lights generate more heat than they do light anyway. Incandescent lighting should also be phased out where possible through the use of taxes that would subsidize the use and research of consumer grade fluorescent and LED lighting.

Finally, *intelligent* governance and legislation are vital to maintaining a stable society. We must not fight wars without just cause, and we should apply our armed forces to public works and social advocacy projects at peacetime. We should be fighting a war on poverty and illiteracy, not terrorism. The war on terrorism is a losing battle, as it requires change abroad, as opposed to a war on hunger that only requires change at home. Our legislators sometimes seem to be little more than tools or employees for corporations. Lobbying is big business, but it is not the average person's business. Really, isn't it the average person that matters most? Government organizations should be pragmatic and representative of the constituents they serve. Too often personal political desires and corporations taint our

processes, and that is why it is important to subject governmental behavior to oversight. All government sponsored organizations should be reprimanded for failing to submit to valid Freedom of Information Law requests pertaining to the uses of funding they receive. Corrupt politicians should be tried as felons. After all, as Dante Alighieri described in *Dante's Divine Comedy*, ~~that~~ the eighth level of hell (the lowest level, higher only than Satan himself) was reserved for those guilty of fraudulence and malice, as well as the hypocrites and panderers – politics after all are rife with fraud and malice – and certainly no one would suggest that political abuse is a new trend.

RE-ENGINEERING CIVILIZATION

When considering the economic, political, techno-scientific, and other institutions in our society, it is certainly easy to see how privilege is directly proportional to power. The people in our society that hold the most power are more often that not from privileged backgrounds. Consider the statistic that zero-percent of our elected officials at the federal level earn less than the national median income – or even twice the median income for that matter. In the land of diversity, pluralism, and freedom, white men with money are the ones that wield the most ~~powerful~~ voting power.

Before the civil war, non-whites in this country were openly persecuted for merely having a higher content of pigment in their skin. The white culture at the time reflected and even encouraged this, as can be inferred from the popularity of bonnets amongst white women (who would shield their faces and bodies from the sun to avoid tanning and thus have the whitest skin possible). But after the civil war and the 'freeing' of the slaves, American society did not simply do an about-face, realize the error in ~~it's~~ ways, and take proactive steps to ensure that institutions like slavery would never arise again. It was hardly fifty years ago that civil rights advocates had fire hoses and other demeaning and torturous

punishments turned ~~at~~ them. Again in this case, the advocates 'won' the battle for equal rights, and the societal institutions changed to accept that, but the members of the society did not necessarily do the same.

Today, the attitudes put forth over two centuries ago still manifest themselves, but in a far more pervasive way. Non-whites don't have to drink from separate fountains or sit in different bus seats by choice but rather by default. A black family could purchase a home in an contemporary community that was nearly all white, but would they really want to, and if they did, would the neighbors respond with an appreciation for diversity and the achievements made with civil rights, or would they respond with silent (or even non-silent) malaise? The door swings both ways, however. Even on the campus here at Rensselaer there is a rift between races that is more often than not left unspoken. An editorial by Damien Pinto-Martin, class of 2005 sums up such silent divisiveness. In 2002, there was an article published in The Polytechnic that openly pondered why it was so difficult to get a diverse crowd at so-called "black events" during that year's black history month. Damien Pinto-Martin responded to that article in his editorial, stating, "We have to think about another reason why it is hard to attract people who don't usually attend 'black' functions. The very idea of racially labeling a function is a reason. Does anyone ever think of anything as a 'white' function?" The point here is that in the process of defining an identity for one's culture, it's easy to be exclusive. The appropriate response is not to create more systems and mechanisms to 'correct' the problems of racial division in our society.

Affirmative action, for example, is a good-spirited but poorly implemented system because of the way that it in effect creates a disenfranchisement for whites. Also, it inherently eliminates the older hiring system in **which the** best qualified applicant was given a position. Even Peggy McIntosh at least confronts the fact that there is racial tension purely as a *result* of affirmative action – point number twenty-two in

her list of white privileges reads, "I can take a job with an affirmative action employer without having co-workers on the job suspect that I got it because of my race." The problem here is that to completely eliminate a program like affirmative action then puts less-than-affluent minorities at a substantial disadvantage. It is one thing to recognize that there is a problem, because it is plain to see. Creating a system that labels people by race and then sorts them systematically, providing advantages to some but not others, is not a solution. Racism *is* a system providing advantage to some but not others. The best way to ~~solve racism~~ is to stop being racist. Unfortunately, racism is usually a deep seated belief. It is one thing to change a person's perceptions on some factual dispute, or to change someone's opinion on some issue, but to change a person's fundamental beliefs is far more difficult, and this is why racism and sexism are so prevalent today – simply because they have been the status quo for so long.

Race and sex issues are best solved by treating members of different races and members of the opposite sex with the same respect that same-race, same-sex people are given – and not with strictly defined regulations on what is fair and equal, because to make such definitions draws a discordant line between people of different backgrounds. **These issues require cultural evolution far beyond the capabilities or scope of any piece of legislation or technology, but such changes are only so difficult because they require every individual to change their personal beliefs and the way they apply those beliefs.** It would seem, then, that there are no clear-cut or distinct ways to encourage an 'everyone wins' system of fair racial and sex representation in the free market.

However, society at large is difficult to control and even more difficult to change. Government, on the other hand, is designed to be adaptive, so why not restructure government to properly reflect the constituents that are served? Professor Edward Woodhouse of Rensselaer suggested such a change – that legislative bodies

be composed of members of races and genders in proportion to the society at large. Incumbents in any given political office are hardly ever voted out of office, despite generally poor performance across the board amongst American politicians on the most significant issues that our society faces. The best way then, he argues, to prevent the organized governmental discrimination that takes place in our legislative bodies is to ensure that races and sexes are fairly represented. For example, every ten years, the census bureau asks people to define their ethnicity, and that data is tabulated and used for a multitude of purposes. Why not, then, take proactive steps to at least ensure balanced governmental representation? Perhaps ~~use~~ the census data to define ~~how large of~~ a proportion of our ~~congress~~ be Hispanic or female.

Based on what has already been written here, it should be clear that I strongly disagree with the idea that further defining race makes racial imbalance any better. I do not disagree with the causes on which members of minority communities base their platforms, because indeed society owes some debt to them to correct the unfairness that is a part of being a member of said minorities. Professor Woodhouse presents an interesting idea on restructuring government, but it is an idea that I believe will only lead to greater racial tension. To refer to ~~Hawken~~, optimizing one variable without optimizing everything is pessimistic to the system. Correcting the racial imbalance of congress does not change the way people at-large think, and as such, I would avoid professor Woodhouse's suggestion on governmental reorganization at all costs. It is one thing to demand equity, but it is another thing to define equity by legislation.

Education, and not legislation, will lead us to a more equitable society.

CONCLUSIONS

In closing, our voracious desire for innovation comes at a cost, and while it is important to not become modern day Luddites, it

is fundamental to carefully calculate the impacts that our choices will have, and be alert to the use of new technologies that may be injurious to our health, culture or environment, while still protecting innovation and ensuring that we move towards a better, more balanced, and politically stable world. Buddhists believe that Buddha – one of the biggest advocates for enlightenment – on his death bed, said these last words at the age of eighty: “Life is a river always moving; do not hold on to things, work hard.” It is this way of thinking that will bring our society to *nirvana*.

AFTERWORD

I propose to find the answer to the following question: in a class that preaches whole system optimization, in which all students and faculty are equipped with state of the art computers, why must students print out sixteen page essays alongside previous revisions of that essay when every student and faculty member is equipped with word processing and email software? My previous paper was seven pages long, and this paper is sixteen pages long, for a total of twenty-three pages. Assume for the moment however that every student handed in fifteen pages (a conservative estimate based on my own assignment). According to the Rensselaer Student Information System, there are fifteen, seventeen, twenty-three, and twenty-five students in each of the four sections of the Science, Technology, & Society class respectively, for a total of eighty students. Eighty students each handing in fifteen sheets of paper requires 1200 sheets of paper. Then, consider that since students do not have class that day, that some are required to travel to drop the papers off, requiring both individual energy and energy spent moving the students via the mass transit shuttle system on campus. The extra students would add to congestion on the buses and increase the wear placed on those buses.

If fifteen pages were handed in three times per semester, with two semesters per year, then within fourteen years, over 100,000 pages, or

2,000 reams of paper would be saved at a net savings of \$10,000 *in paper alone* (assuming that a ream of inexpensive laser printer paper is \$5). Then, considering that a high quality commercial laser printer imposes of a cost of roughly four cents per page, the savings of ink used on the saved paper would amount to another \$4,000. Using liberal estimates, a fully grown pine tree can produce about 80,000 sheets of paper. But do so requires time and an incredible amount of energy devoted to transportation of the wood, and then pulping, bleaching, packaging, and shipping the paper to distributors and retail outlets. To drop the paper off will require at least twenty minutes round trip from most points on campus, which when multiplied by eighty students per term amounts to 26 and 2/3 student-hours total per term, or a full student-month when using the fourteen year example. On top of this, with the amount of saved travel time, and saved energy used in transporting the students and paper to their ultimate destinations – it is clear that there is a logical flaw in the method of submission for these term papers. Note that by formatting my paper in its current format, I cut the amount of paper required by about 60% and made it more aesthetically pleasing.

Also, the various installments (not attached) to my final project are available online at <http://www.peterubriaco.com/sts/>.

On another note, I find it difficult to discuss issues of race and gender equity, and I have all semester. I found that generally speaking, it was undesirable to disagree with you (Prof. Layne) because more often than not you would deny people of their right to hold opinions differing from your own. In general, I just found that you were too militant with your beliefs if you detected that anyone did not agree with you. I believe *firmly* in equity – and I *know* that I am one of the most progressive males amongst my peers – but I don't believe in reverse discrimination. When you talk about gender issues, you take things a little bit too far. I shouldn't have to feel

guilty that other people have done things before me, because I haven't. In the same way that it's not the fault of a minority for simply not being a white male, it's not my fault that I *am* a white male.

Surely you must at least recognize that it's hard to seriously discuss racial issues with a class composed like the one you had this semester. There was not a single black student in the class, and there were only four women or so out of about twenty, but we frequently discussed discrimination. Who amongst the members of that class knows even the first thing about what it means to be discriminated against because of their race? The class composition was inherently slanted. I'm sure that you can see that I am not suggesting that it's not important to talk about gender and racial issues, but rather that it's ironic and even disconcerting that for the most part, those discussing the issues were composed of a more-or-less homogenous race and gender.

I did, however, thoroughly enjoy this class despite that particular concern. I no longer accept the status quo because of this class. I've changed a number of my behaviors as a result of the critical thinking attitude that I adopted as a result of this class. I have stopped smoking cigarettes, I now rollerblade rather than drive or take a bus to class (conditions permitting), I shut lights off behind me when I leave a room, and I turn the air conditioner off when it suffices to open a window or remove a layer of clothing instead. Furthermore, I have found that my personal blog entries have become more prolific and in-depth. It feels good to think that perhaps I can affect a change in the way other people think as well. If it ain't broke, make it better. Thank you for an excellent semester, I wish you the best in the future.

Sincerely,
-Peter Ubriaco
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