the gumption memo

an open letter about what to do next...

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The world is before you, and you need not take it or leave it as it was when you came in.
— James Baldwin

A Note on Numbers

I've tried to take care to ensure that the facts and figures presented in this letter are reliable. I believe that most of them are accurate to within a few percent, although I'm sure that some are disputable, some are out-of-date, and some are wrong. If you've seen figures that you believe are inaccurate, write me and tell me, but don't let that alone turn you from the basic arguments—this letter paints a picture of the world in very broad strokes, and minor defects in the painting should not interfere with seeing the general picture.

A Note on National Bias

I want to apologize in advance to everyone outside of the United States of America reading this Gumption Memo. The Memo addresses all sorts of general global problems, but unfortunately in dozens of little ways it assumes that most readers live in the United States and it caters to United States readers. When I first produced the Gumption Memo in 1993 I gave it out mostly just to friends and family in the United States, so the national bias was reasonable, but now that it's distributed on the World Wide Web I'm afraid that it will come off as a little provincial. Please accept my apologies.

The Gumption Memo

Autumn 1996

Background

In recent years we've made outstanding progress on many fronts. In just the past 20 years we've increased the average human life span by more than 7 years and reduced infant mortality by 30%. We're decreasing our global military spending, and we've begun to dismantle our nuclear arsenals. Worldwide, from the former Soviet Union to South Africa, we're replacing oppressive, unrepresentative governments with democratically elected governments.

Unfortunately, on other fronts we're slipping. The physical condition of the earth worsens each passing year. Forests shrink, deserts expand, soils erode, and groundwater is poisoned. Despite growing public concern, the rate of deterioration is increasing, and the population is rising. Every year we add another 93 million people to a world ill-prepared to support them. In our effort to forge a better future we are losing ground, both literally and figuratively.

I am not an environmentalist, and I don't especially care about things like topsoil and groundwater in and of themselves. I do care about human suffering. Today about 36,000 children died, largely for lack of food and clean water. Tomorrow another 36,000 will die. Unless we make radical changes, in my lifetime I'll see over a billion children die needlessly.

My background is in engineering, and I'm inclined to look at the world as one large system. Soil and water are important parts of that system, but many other parts also warrant attention. If we set out to address human suffering we'll need to look at a wide range of factors, including health care, pollution, economic growth, race relations, and emerging technologies. The problems are large and complex, and our future promises to be extremely volatile. Fortunately, there is a great deal that you and I can do, as individuals, to build a brighter world.

About the Author

My name is BK Skinner. I live in Menlo Park, California and work as a computer programmer. When I first started writing this Gumption Memo back in 1992 I had spent most of the previous decade programming computers—first in college, and then to earn a living. Like most people, I had a rough sense of the imperiled state of the world and a fair amount of concern for the welfare of the world's people, but I never paid close attention to figuring out just how all the headlines fit together. In 1992 I unexpectedly inherited $50,000, and I decided to use it to alleviate world problems and prevent some suffering. After that I started studying up on the world situation. Reading books and papers. Attending lectures. Evaluating non-profit organizations and reading their literature. Thinking. Writing. Discussing. I learned a lot and wrote a lot, and now I'd like to share my thoughts with you.

The one thing I want to emphasize about myself is that I'm just an ordinary person—I'm not rich or famous, I'm not affiliated with any organizations, and all the opinions expressed here are my own. I don't ask you to agree with everything I have to say, but I do ask you to continue to think about important issues and take action on your conclusions.

The Trust

The Gumption Trust is a modest trust fund I established in an effort to do my part in addressing world problems. In January 1992 I endowed the trust with a little of my own savings, plus money from the estates of my father, Robert Lee Skinner, and his sister, Lois Arden King. My mission for the Gumption Trust was to prevent or alleviate as much human misery as possible by

- taking personal responsibility for world problems,
- carefully allocating the resources available to me, and
- encouraging others to do the same.

In December 1995 I made the final round of Gumption Trust donations and gave away the last of the Gumption Trust money—about $83,000 in all. Carefully spent, $83,000 was enough to dramatically improve the lives of a dozens of people, which is itself a wonderful thing. But I hope to accomplish more. I hope to get your attention.

gump•tion *\'gəm(p)-shən\ n*
(1719)
1: shrewd practical common sense esp. as actively applied to the problems of life
2: ENTERPRISE, INITIATIVE

gump•tion trust *\'gəm(p)-shən 'trəst\ n*
(1992)
1: a clearinghouse for ideas and information about world problems
2: a concerned individual striving to actively apply shrewd practical common sense to the problems of life
3: a modest trust fund set aside to alleviate a little human misery

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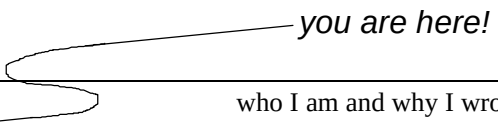


World Problems

investigating world problems and identifying personal priorities and objectives

The World Game: To make the world work for 100% of humanity in the shortest possible time through spontaneous cooperation, without ecological offense or the disadvantage of anyone.

— Buckminster Fuller

No environmental problem threatens the "planet" or rates with the danger of nuclear war. No oil spill ever caused suffering on a par with today's civil war in Yugoslavia, which is a minor episode in human misery. World War II left more than 35 million dead. Cambodia's civil war resulted in 1 million or 3 million deaths. The great scourges of humanity remain what they have always been: war, natural disaster, oppressive government, crushing poverty and hate. On any scale of tragedy, environmental distress is a featherweight.

— Robert J. Samuelson, *Newsweek, June 1, 1992*

Perceptions and Priorities

Perceptions

A lot of people are working hard to make the world a better place, but building a better world means different things to different people. The Catholic Church and Planned Parenthood are both built around the idea of going to the people and giving them what they need, but the two organizations have vastly different perceptions of the world, different objectives, and different approaches.

Beliefs

Here are a dozen statements about the world. For each statement, decide whether you agree or disagree.

		yup				nope
1	I believe that using only current technology it is possible to give the whole planet the kind of life-style that the Americans have.	O	O	O	O	O
2	Money can buy happiness, at least when used with shrewd, practical, common sense.	O	O	O	O	O
3	I believe the children of the developed nations have a right to more and better food, education, and health care than the children of developing nations.	O	O	O	O	O
4	Inheritance is an inequitable custom by which rich kids stay rich and poor ones stay poor. All children deserve equal treatment, regardless of their parentage.	O	O	O	O	O
5	From each according to their abilities. To each according to their needs.	O	O	O	O	O
6	I believe everyone has the right to an equal chance, without regard to race, sex, nationality, or other attributes of birth.	O	O	O	O	O
7	I think we should solve our own problems here at home before we try to help people in other countries.	O	O	O	O	O
8	There are a billion people without enough to eat in the world today. We need to help those people even if it means using up resources and mortgaging the future.	O	O	O	O	O
9	We must save the environment at all costs, even if it means cutting back on global energy use and allowing some of today's population to die.	O	O	O	O	O
10	The previous two questions are too negative. We have sufficient resources to protect the environment, take care of today's population, and plan for the future.	O	O	O	O	O
11	Whatever happens here on the earth, it's imperative that we get off the planet before it's too late. Saving the race is more important than saving the earth.	O	O	O	O	O
12	It is within my power to change the world—to make it more fair, more safe, and more humane.	O	O	O	O	O

(For those of you who are curious, my own answers to these questions are "yup" on 2, 4, 6, 10, and 12, and "nope" on the rest.)

Objectives

Each of us has our own world view, our own beliefs, values, priorities and objectives. That's great—it gives us diversity and individuality. So when we set out to change the world we focus on different problems. In this letter I tend to focus on my own priorities, but I also present a great deal of information intended to be useful to people with very different priorities. The following pages present ideas, tools, and techniques which address *how* we identify and attack problems, regardless of personal objectives.

The first step in any endeavor is to define objectives and priorities. The questions above are examples of questions that can help to identify beliefs, objectives, and priorities. By identifying objectives early on, you free yourself to rationally weigh problems and solutions in terms of your own objectives.

Exercise

Get a copy of *Balance of the Planet*, a computer game that uses a mathematical model to reflect a systems viewpoint of the world. After playing the game a couple of times, adjust the scoring constants to reflect your own personal priorities and goals. (See the appendix for a brief review of the game and information about how to get it.)

Bottom Line

Perceptions and objectives are the foundation of all action, so strive to declare them explicitly.

Problems and Priorities

Problems and Priorities

We're all aware there are a lot of problems in the world. Our TVs and newspapers provide us with daily updates on the latest and most interesting calamities—three whales trapped near the north pole, little Jessica McClure trapped in a well, O.J. Simpson fleeing from the police, or David Koresh's cult of Branch Davidians in Waco, Texas. This media coverage inevitably colors our perceptions about which problems are most crucial.

But what should our priorities be? The list on this page shows a sampling of some newsworthy, "popular" problems along with examples of the hardships that these problems cause. The media presents us with a good collage of these problems, but offers us little information to compare, contrast, and prioritize them. Which are the most serious and not just the most newsworthy? Which cause the most harm—the most suffering and misery? Which directly affect the most people? Which are the most readily addressed? Which are the most cost-effective to address—which ones yield the most prevented suffering per dollar of remedy?

Newsworthy Problems	Example Hardships
War	Death, destruction
Civil Unrest	Riots, looting
Violent Crime	Murder, rape
Domestic Violence	Rape, abuse, fear
Civil Liberties Abuse	Political imprisonment
Nuclear Weapons	Hiroshima & Nagasaki
Chemical Weapons	Illness and death
Biological Weapons	Disease and death
CO2 Emissions	Global warming
SO2 Emissions	Acid rain
Air Pollution	Lung cancer
Acid Rain	Damage to forests
CFC Emissions	Ozone depletion
Oil Spills	Loss of wildlife
Nuclear Waste	Contamination of soil and water
Growing Deserts	Loss of fertile land
Global Warming	Rising oceans, crop losses
Species Extinction	Loss of genetic diversity
Flooding	Loss of land, homes
Soil Erosion	Loss of food supply
Vanishing Forests	Loss of genetic diversity
Ozone Depletion	Cancer
The Energy Crisis	The Gulf War
Excess Military Spending	Loss of $1 trillion/year
Energy Waste	Pollution, financial loss
Economic Inefficiency	Food shortages
Beef Production	Deforestation, extinction
Traffic	Irritation, wasted time, pollution
Alcoholism, Drug Abuse	Wasted lives, violence
Illiteracy	Wasted potential
Poor Basic Shelter	Disease and death
Poor Basic Health Care	Disease and death
Food Shortages	Starvation
Contaminated Drinking Water	Disease and death
AIDS	Disease and death

Exercise

Have a look at the list of newsworthy problems. For each of the descriptions below, list a few problems that you think fit the description.

Get the most media coverage:

war, drug abuse, oil spills, domestic violence, AIDS

Affect the most people:

Cause the most misery:

Most inexpensively addressed:

Exercise

Name a few, serious, tangible problems which aren't on the list.

racism, sexism, government oppression...

Bottom Line

There are a lot of problems. In attacking them, how do we distribute our resources to best meet our objectives?

The Root of the Problem

I think it's useful to characterize the hundreds of widely-discussed, popularized problems, like AIDS and carbon dioxide pollution, in terms of a handful of root problem types, like *Information Problems* and *Population Problems*.

In general, I think attacking problem roots is more effective than attacking problems. My guess is that if your objective is to solve specific problems, then working to address root problems is vastly more cost effective than actually funding solutions to specific problems. Installing telephone networks was a cheaper way to prevent robberies than increasing funding to police departments. Funding family planning programs may be a cheaper and more effective way to prevent species extinction than funding breeding programs for the duck-billed spotted salmon. On this page I offer definitions for four sample root problem types.

Information Problems

An information problem is a problem that would be greatly alleviated if only the people involved knew some basic facts. AIDS is partly an information problem. If everyone who had AIDS knew it, and if their partners also knew it, then the spread of AIDS might be somewhat reduced. Violent crime is partly an information problem. If every time a person was mugged, the victim could instantly communicate the identity of the mugger to the police, and to everybody else within a one mile radius, the number of muggings would be greatly reduced. Carbon dioxide pollution is not an information problem. Knowing where and when CO_2 is produced does not help us to stop producing it. We know exactly what processes produce CO_2, and yet the people of the world continue to burn wood, use electricity, and drive cars. Literacy, telephones, photocopiers, fax machines, computers, televisions, VCRs, and cameras all help to prevent information problems.

Tribalism Problems

Tribalism problems are problems caused by racism, sexism, homophobia, nationalism, and the like. War and civil unrest are partly tribalism problems. Carbon dioxide pollution is not a tribalism problem. You can think of tribalism problems as those that would be solved if all the people in the world were identical clones. Things that help alleviate tribalism problems are travel, mutual economic dependence, education, and an atmosphere of open-mindedness and tolerance.

Population Problems

A population problem is one where the effect per person would be greatly reduced if there were fewer people. Sexism is not a population problem. If the world had a tenth as many people as it does, those remaining would be no less inclined to mistreat each other based on sex than they are now. Carbon dioxide pollution is a population problem. The earth has some natural ability to compensate for minor changes in atmospheric CO_2 levels. If the world had a tenth as many people as it does we would produce a tenth as much CO_2, which the earth might well accommodate with no threat of global warming. Most ecological problems are population problems. Population problems can be addressed by lowering the population (e.g. through voluntary family planning) and sometimes by consumer restraint or technological fixes like catalytic converters.

Compassion Problems

A compassion problem is a problem that would be greatly alleviated if everyone in the world cared enough about each other to work toward solving it. By this definition, war is a compassion problem. If we cared enough about each other we wouldn't fight wars. Dirty drinking water is a compassion problem. We could greatly alleviate this problem if we cared enough about the 1.2 billion people who don't have clean drinking water. Some people are worried the Earth may be hit by a giant asteroid. Protecting the earth from falling asteroids is not a compassion problem. There just isn't much we can do to stop giant asteroids, even if we all cared a lot about the problem and worked hard to prevent it. *Almost every problem other than giant asteroids is a compassion problem*.

Exercise

Look back at the list of problems on the previous page. Try to identify the underlying root problems for each. Many of the problems listed there may actually have several roots. For example, the root problems underlying War might include Tribalism, Population and Compassion.

Try to identify a few additional root problem types.

Bottom Line

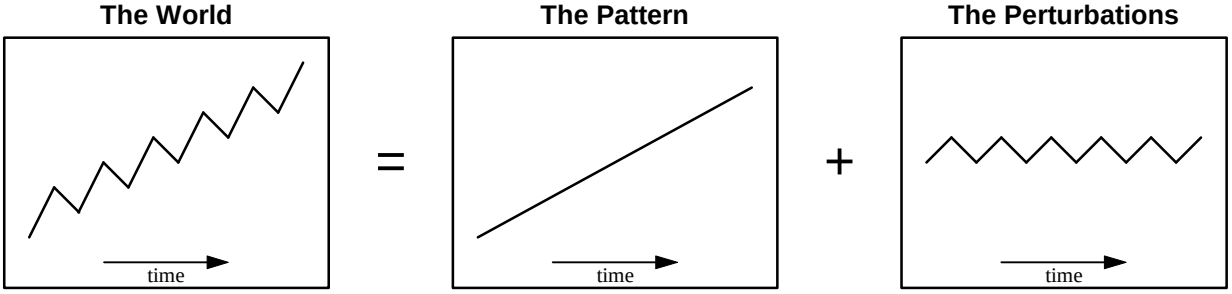
Attacking roots may be the most efficient way to address problems. When you read about a specific problem, think about what its roots are and how to attack them.

Signal and Noise

News and Noise

I believe the media grossly distort our perceptions of world problems. Our sources of news and information do not accurately portray the world around us. Newspapers, magazines, and television news programs all focus on recent events—they look at dramatic but superficial changes to the state of the world, rather than at the state of the world itself. If you listen to the mass media you hear a lot about factory explosions and plane crashes, car-jackings and oil spills, whales trapped near the north pole and little girls trapped in wells. You don't hear much about business as usual—systemic problems that haven't changed much since last year, like soil erosion and dirty drinking water. Our serious problems do not make for fast-breaking news—they're problems that have been building steam for years. They're old and boring, but terribly important.

My recommendation: If you're serious about being well informed—get your news from low frequency sources, not high frequency ones. Read books and reports, not newspapers and periodicals. Watch documentaries, not CNN. Focus on the big picture—the pattern, not the perturbations in the pattern.



14 Million Starve this Year
Population Grows 93 Million
Lost: 24 Billion Tons of Topsoil

24 Dead in Bus Plunge
Abortion Clinic Bombed
Major Union Strike!

> There are occasional tragedies, such as the accidental release of poisonous gas into the air above Bhopal, India, which capture the whole world's attention. But the constant deadly levels of air pollution in cities throughout the developing world do not, even though on a "normal" day they are responsible for the deaths of more people than died at Bhopal.
>
> — Vice President Al Gore, *Earth in the Balance*

Signal to Noise Ratio

Back in college I studied electrical engineering. Electrical engineers like to think in terms of signal to noise ratios, and they try to design equipment that responds to signals while ignoring noise. In many electrical engineering problems the noise consists of high frequency perturbations while the signal is a lower frequency pattern. The noise is an artifact of how you transmit information, and it should be filtered out. The signal represents important real world information which must not be ignored.

Inertia

In the world of human problems, the signal represents real world trends that have enormous inertia. Because of the chemistry of CFCs in the ozone layer, the chemicals already in the ozone layer will continue to eat away at our ozone for decades to come. That's inertia. CFCs that we released a decade ago have yet to reach the ozone layer and begin their decades long process of destruction. That's inertia. Your car and my refrigerator still contain CFCs that were produced a decade ago—these CFCs have yet even to be released into the atmosphere to begin their journey to the ozone layer, to begin eating away at the ozone. That's inertia. Our factories have yet to stop creating new CFCs to put in new cars and refrigerators which will last another decade before their CFCs are released. That's inertia. Like ozone layer depletion, many serious human problems exhibit inertia. Population growth has its own inertia, which I'll describe later in the *Landmarks* section.

> People can complain about these incinerators all they want. They can argue against them, they can write to editors, but in the end, the garbage is going to win.
>
> — Brendan Sexton, former New York State sanitation commissioner

Bottom Line

Pay attention to the pattern, not the perturbations—the signal, not the noise.
It's easiest to find the signal by reading books, not periodicals and newspapers.

We can now see the rings of Saturn, the atoms of a molecule, the valves inside the human heart, and the entire earth rising above the moon's horizon. We can hear the recorded voices of speakers who have long since died, the music of whales at the bottom of the sea, and the cries of a baby trapped in an abandoned well a thousand miles away. We can walk down the aisle of a plane traveling twice the speed of sound, leave Europe at lunchtime and arrive the same day in New York for a late breakfast. We can grasp the levers of a giant crane and, like Atlas, lift the weight of a thousand men.

— Vice President Al Gore, *Earth in the Balance*

Think of it. ... We are blessed with technology that would be indescribable to our forefathers. We have the wherewithal, the know-it-all, to feed everybody, clothe everybody, give every human on Earth a chance. We dwell instead on petty things. We kill each other. We build monuments to ourselves. What a waste of time. Think of it. What a chance we have...

— Buckminster Fuller

Smart Decisions

obtaining information and applying decision analysis to make high-quality philanthropic decisions

Men who have both made and given away millions testify that giving intelligently is much more difficult than making a fortune. We who are not rich may find that hard to believe, but we should be impressed by overwhelming agreement among those in a position to know.

— Garrett Hardin, *Filters Against Folly*

It's a difficult thing to do it and do it well. It's actually harder to give it away intelligently than it is to make it.

— Ross Perot

Decision Making

Background

In the previous section, *World Problems*, I outlined some serious problems plaguing humanity. In order to effectively address these problems we need to make some tough decisions and find the best possible answers to critical questions. Given significant but limited resources with which to make the world a better place, how do I allocate those resources to best advantage? *Which problems are the most serious? Which ones cause the most suffering today? In a hundred years, which ones will have caused the most suffering? Which are easy to fix, and which are hopeless?* And the key questions: *Which problems yield the most preventable suffering per dollar of remedy? How do I allocate my limited resources to most effectively meet my objectives?*

People make important decisions all the time, and most of the time they do a good job. They make decisions without needing to quantify probabilities and outcomes, instead relying on a sense of risk and some feeling as to the relative desirability of the various outcomes. Decision Analysis is a branch of mathematics which breaks down the decision process to quantify all the probabilities, outcomes, and cause-and-effect relationships which affect the decision. Formal decision analysis does not contradict the "intuitive" human decision making—it pursues the same course but with sharper focus.

Intuition

There are a couple cases where intuitive decision making fares especially poorly. First, human intuition fairs poorly in decisions where most of the information you would like to have is not available. People make decisions easily when the alternatives are well distinguished and the likely outcomes for each alternative are clear. But many important decisions must be made with "high uncertainty." Most of the information one might want just isn't available. The number of alternatives is bewildering. The effects of the alternatives are just guesses. Intuition is fine when things are clear, but with high uncertainty, intuition is too uncertain to provide reassurance. The uncertainties distract from what little information there is and under this stress people often begin to think "this is hopeless" or "I have no idea." Confronted with a decision at that point, people may avoid making a decision, pick an alternative at random, or choose the most conservative alternative to avoid short term, visible risk as much as possible. These are poor choices.

Intuitive decision making also fairs poorly when the decision somehow incorporates very large or very small values. Most people have a reasonable sense of values as small as a hundredth or thousandth. But very small values such as one millionth and one billionth all get lumped mentally into the "very small value" category. If you ask a person directly for the difference between two very small values, they can convert the values into the explicit number system we all learned in grade school and compute the difference explicitly. However, if you ask a person to make a decision which hinges on weighing the difference between the two very small values, their intuitive sense will fail to distinguish between them. The problem was, they were never challenged to convert the conceptual values to concrete numbers. This is fine for reasonably sized values, but for very large or very small values, the intuitive sense cannot make distinctions.

Decision Analysis

Decision analysis does not magically solve these problems—but it does much better than intuition alone. Even with very little information, decision analysis can piece together a course of action which is much better than just guessing. Decision analysis accepts uncertainty in any or all of the elements of a problem and does the best job it can. In the next couple pages I'll present some examples of important decisions involving very large and very small numbers, outline some strategies people can use to make better decisions, and discuss some important factors that a good decision making technique should account for.

> When decision analysis was first developed, a common comment was, "If this is such a great idea, why doesn't [insert name of large, famous company] use it?" Today, it is difficult to find a major corporation that has not employed decision analysis in some form... Increasing uncertainties and rapid change require fresh solutions rather than tested "rules of thumb." Some day, decision analysis of important decisions will perhaps become recognized as so necessary for conducting a provident life that it will be taught in grade school rather than in graduate school.
>
> — Ronald Howard, *The Evolution of Decision Analysis*

Bottom Line

Decision analysis can help us overcome the inadequacies of human intuition when making tough decisions.

MicroMorts andMegaTragedies

MicroMorts

In 1980 Ronald Howard wrote a paper entitled *On Making Life and Death Decisions*, in which he introduced the term *micromort* (mmt), which he used to mean a one in a million chance of death. In the paper, which originally appeared in a book published by General Motors, Ronald Howard points out that the average American runs maybe a 270 mmt/year risk of being killed in a car crash, a 28 mmt/year risk of drowning, and a 7.5 mmt/year risk of dying in a plane crash. People's perceptions of those risks are not consistent with the real risks, and as a result their behavior is sub-optimal—they should be buying more automobile airbags and less airplane trip insurance.

Thoughtless Compassion

Like buying airplane trip insurance instead of airbags, acts of thoughtless compassion fall far short of reaching rational objectives. Suppose you love little children and you hate to see them die slow, unhappy deaths. You've recently heard that little Jessica McClure is trapped in a well. When asked by a neighbor to contribute $35 to the local firefighters' fund you readily agree to pitch in to cover the cost of the rescue. After all, what else is there to do? *We can't just leave her to die, can we?*

But as a result of donating that $35 you now have $35 less to give to Planned Parenthood International. If your objective was to prevent little children from dying slow, unhappy deaths, you would have come closer to reaching your goal by donating it to Planned Parenthood, which would have used the money hundreds of times more efficiently. By helping Jessica you left another 36,000 to die that day. *We can't just leave them to die, can we?* We can and we do, every day. But we don't need to.

Mega Tragedies

I want to introduce the term *megatragedy*, by which I mean the collective experience of a million tragedies—unhappy, painful events. Let's arbitrarily say that spending a year of your life slowly starving is a tragedy. That means that the human population experiences perhaps 40 megatragedies/year due to starvation. Alcoholism accounts for maybe another 10 megatragedies/year, car crash fatalities about 0.3 megatragedies/year.

These grand totals imply some assumptions. For example, to calculate the total for car crash induced tragedies we need to estimate the total annual incidence of car crash fatalities and then multiply it by the average tragedy value per fatality. But to come up with a tragedy value per car crash fatality we need to be able to compare the misery and suffering induced by a starvation with the misery and suffering induced by a car crash fatality. Of course we have no way of comparing these miseries objectively. It's crazy to even try. Or is it?

Aren't we actually making this kind of value judgment all the time? Think about making the decision to stay late at work at the cost of walking home alone after dark. As you make that decision you do a simple cost-benefit analysis, often without even thinking about it. You weigh the benefit of staying late against the risk of being accosted and the probable misery if you are. For small decisions it's fine to do the math in your head, even subconsciously. For larger decisions it's worth double-checking by doing some math on paper too, even if it means having to make crude estimates to quantify things that you'd rather not even think about.

> The formulation of the problem is often more essential than its solution.
> — Albert Einstein

> If you choose not to decide you still have made a choice.
> — Rush

Efficiency

The people of the world spend hundreds of billions of dollars per year on philanthropic endeavors, in an effort to prevent or alleviate some of the hundreds of megatragedies the world population endures annually. Are we spending that money efficiently? I don't think so. Many people are doing the math in their heads, guessing about how efficiently their money will be used, and how important it is to solve different problems. Unfortunately, many of their decisions—though well intentioned—are not the most effective solutions in attaining their desired goal.

Bottom Line

Quantitative comparison is an essential tool for making informed decisions about how to offer the most help.

Decision Making Techniques

Background

In *A Tutorial Introduction to Decision Theory*, D. Warner North succinctly describes decision theory as "a rational framework for choosing between alternative courses of action when the consequences resulting from this choice are imperfectly known." In this letter I'm using the term decision theory a little more loosely, to refer to almost any kind of math or logic or reasoning that you can apply to real-life situations to make better decisions. In reality there are a number of related fields, with a number of related names: decision theory, operations research, decision analysis, systems science, Bayesian analysis, management science, systems analysis, game theory, etc.

Practicing full-blown, formal Decision Analysis requires a lot of probability and mathematics, but fortunately, the complete rigorous treatment of the discipline is rarely necessary. The simplest precepts of Decision Analysis are also its most useful. A couple of basic skills can sharpen anyone's decision making.

Basics

Here are some of the Decision Analysis strategies a person can use when thinking about a problem: Ask what the alternative courses of action are. Ask what the likely outcomes are. Decide what your relative preferences among the outcomes are. Concretely list alternatives and outcomes. Use numbers to represent values. Resist the temptation to just juggle and compare perceived values in your head. Work in numbers, even if they are just estimates. Estimates, guesses, and probabilities are okay, but you need to include all the cases—even the ones which seem unthinkable. The only answer which is not allowed is "I have no idea." That is almost never the case. You can always make an estimate. This analysis will not tell you what is going to happen, but it can give you a good idea of what is likely and what impact your decision may have. One of the main results of Decision Analysis research has been to show that a decision patched together with guesses and estimates is far better than no decision.

The basic strategies outlined above form the foundation of a good decision making technique. Good decision making should also account for important factors like personal priorities, short and long term effects, and interrelationships between different problems.

Values and Time

As I pointed out in the first section of this letter, people's values and priorities vary widely. For instance, many people have a preference for preventing tragedies in their own country before helping people overseas. Our decision making process should be sensitive to personal values and priorities, and similarly, should account for both short-term and long-term effects. Take famine as an example. We can prevent famine tragedies either by sending food today to the current famine hot spot or by working to prevent famine a decade from now by funding family planning, irrigation, education, etc. Both methods will work, but some people have a preference for preventing the tragedies that will happen next year before preventing tragedies that will happen later, so our decision making process should account for both the short and long term effects, and weigh them against our priorities.

Dependence

Additionally, our decision making process must not treat problems as being independent of each other, and the solutions as having only one effect. Actually, all the problems are tied up with each other, and a "solution" often alleviates a number of different problems, while contributing to other problems. A common mistake we make is to think an action can have only one effect. In reality, you can never do just one thing. Our culture has learned to think in terms of effects and side-effects, but side-effects are really first-class effects that we've simply chosen to downplay. Our decision making process should account for interdependencies, and should help us identify solutions that leverage off interrelationships and common problem roots.

> Remembering that one of the functions of language is to prevent thought, we easily recognize the purpose of the term "side effects": it is to discourage thinking about the total effects of a new medicine, a new pesticide, or a new public works project when some of the consequences prove embarrassing to the promoters. ...an effect is an effect is an effect. The adjective "side" is added to coerce thinking—to restrict questions to safe channels (safe for the promoter's enterprise).
>
> — Garrett Hardin, *Filters Against Folly*

Bottom Line

We need to use decision making techniques that account for personal values and priorities, short and long term effects, and interdependencies between problems.

Decisions, Systems and Models

Systems Analysis

The basic decision making guidelines from the previous page can be very helpful in making personal decisions. For larger and more complex decisions—ones that are global in scope—it is useful to also draw upon formal techniques to analyze the many dependencies and interrelationships. In order to make good decisions we need good estimates of probable outcomes of different actions. In simple cause-and-effect situations it's fairly easy to make good estimates of probable outcomes, but as the systems about which we're making decisions grow increasing complex it becomes harder and harder to predict the results of our actions. Systems Analysis and Mathematical Modeling are tools that can help account for complex dependencies and interrelationships, and can help provide better predictions about the results of our actions. Systems Analysis and Mathematical Modeling are an important part of good decision making.

Many people have carefully studied the interrelationships between different world problems and their solutions. I think some of the most interesting work is the application of systems analysis to world problems outlined in the book *Beyond the Limits*, by Donella H. Meadows, Dennis L. Meadows, and Jorgen Randers. (See the appendix for a complete citation.)

> The most important part of our way of looking, the part that is perhaps least widely shared, is our systems viewpoint... Systems training has taught us to see the world as a set of unfolding dynamic behavior patterns, such as growth, decline, oscillation, overshoot. It has taught us to focus on interconnections. We see the economy and the environment as *one system*. We see stocks and flows and feedbacks and thresholds in that system, all of which influence the way the system behaves.
>
> — Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, *Beyond the Limits*

World3

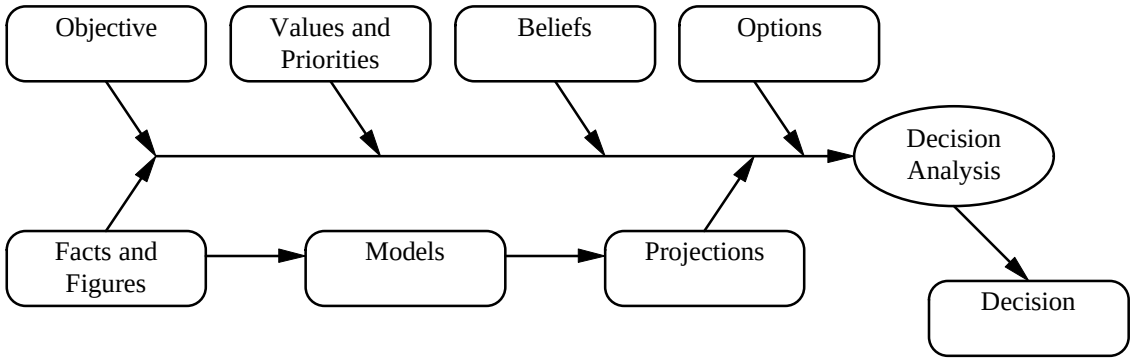
In *Beyond the Limits*, the authors discuss *World3*, a mathematical model used to investigate the behavior of the world as a system, catalog possible scenarios for the future, and identify actions we can take today to guide us toward happier, less tragic futures. The *World3* model is publicly available and runs on home computers. It does an outstanding job of accounting for the most important interrelationships between problems, and accounting for time lags and both short and long term effects of actions.

Balance of the Planet

Balance of the Planet is another interesting computer program that uses a mathematical model to reflect a systems viewpoint. *Balance of the Planet* is sold as a game, but I use it as an educational aid, a reference book, and an inspiration. It does an excellent job of addressing values issues by allowing players to set their own objectives and then accounting for subjective issues and personal values and priorities. In *Balance of the Planet* players assign weights to the different tragedies experienced by the simulated population of the world. By taxing some actions while subsidizing others, players strive to optimally manage their limited resources to best achieve their own objectives. (See the appendix for a complete citation.)

Summary

I think the techniques of decision theory and systems analysis are important and underused. These techniques can be extremely useful for making important decisions that involve great uncertainty, long time horizons, significant value issues, and complex interrelationships.



Bottom Line

Good work is being done using systems analysis and mathematical modeling to investigate solutions to world problems. You and I, as individuals, can review this work.

Benefits of Modeling

Perspective

Apart from any value we get from the results that mathematical models provide, the process of simply building and studying the models is extremely valuable. For starters, in working with models like *Balance of the Planet* and *World3*, either in building them or exploring them, one is drawn toward a high-level view of the world. From this elevated vantage point bigger problems appear bigger and smaller problems smaller, where from the trenches it may be impossible to see the bigger problems because they're occluded by smaller, more immediate problems. We live in a world starving for perspective, plagued by insidious special interests, short-term thinking, hidden agendas, and "cause-ism." Tools and techniques that offer hope of objective comparison should be embraced.

> When viewing the overall pattern of worldwide environmental degradation, we sometimes find it difficult to attain a sufficiently distant perspective from which to make sense of the confusing jumble of information.
>
> — Vice President Al Gore, *Earth in the Balance*

Discipline and Teamwork

Secondly, building and refining these models requires a focused study of real-world systems, ensures quantitative analysis, and demands careful attention to details and definitions of terms. This sort of work forces discipline and helps insure against intellectual sloppiness. Model building also helps us focus on interrelationships, not individual problems. Researchers from different disciplines must work together to see how the things they study influence each other, focusing on interdependencies, rather than particular facets of the whole.

Honesty

Thirdly, models like *Balance of the Planet* encourage their users to evaluate policy decisions in terms of perceived costs, benefits, and opportunity costs. This sort of evaluation requires explicit statement of values and priorities, and promotes rational optimization of stated goals. Thinking about morals and values in the context of rigorous models helps to fight thoughtless compassion.

> I'm impressed with the reluctance of society to confront certain issues, and the ingenuity people show in developing a rhetorical defense against controversial concerns.
>
> — Garrett Hardin

Uncertainty

One of the most common criticisms of models like *World3* and *Balance of the Planet* is that they are built out of uncertain guesses that over-simplify complex systems we don't fully understand. That's true, but the alternative seems to be to rely solely on mental models, which have the same uncertainties and over-simplifications and which also substitute impressions, estimates, and general guidelines for known facts, measured values, and reliable mathematical techniques. Rather than abandoning the mathematical models as worthless, I think we should work to make them better—larger, more detailed, more accessible, and more easily expanded and modified.

Exercise

A few years ago I worked for a big bank on Wall Street, where I was paid $105 an hour to help build a computer program to apply advanced mathematical modeling techniques to large and complex sets of real-world data in order to ensure the bank will continue to make scads of money even in the face of uncertainty. Wall Street banks and big oil companies make extensive use of mathematical models, probability, and decision theory, in spite of the fact that the models are incomplete over-simplifications that must deal with uncertainty. Explain why Wall Street banks do this while Greenpeace and the United Way don't.

A. Wall Street bankers are kind and generous, and want to help out programmers and mathematicians.
B. Wall Street banks are not very conservative and are always trying new things before their time.
C. Wall Street bankers are so motivated by emotion they haven't thought about what they're doing.
D. Wall Street banks can afford better decision making technology than charitable organizations.

Bottom Line

Collaborating to build and study formal models of world systems is a rewarding enterprise that we should be doing far more of.

Landmarks

creating mental models and discovering important landmarks that shape the world

[Our resistance to fallacious information] could be much enhanced if material on the human predicament were woven into basic teaching in elementary and high school, and if every college student in the nation were required to take at least one course that gave a basic overview of the "state of the planet." At Stanford University, there has been considerable uproar over the content of a required "Western Civilization" course. But most students (and most faculty) remain ignorant of the size and growth patterns of the human population, what is involved in producing food, how ecosystems provide essential services to society, the comparative deployment of U.S. and Soviet nuclear forces, how people's perceptual systems give them a biased and inadequate view of the modern world, the basic theory of evolution, and the laws of thermodynamics. All these are more important to the average citizen than what Plato or Richard Wright wrote or who was gathered at the Congress of Vienna. ... The complacency with which our education system at all levels accepts the production of citizens hopelessly unequipped to understand the population explosion and many other aspects of the modern world is a national disgrace.

— Paul and Anne Ehrlich, *The Population Explosion*

Human history becomes more and more a race between education and catastrophe.

— H.G. Wells

Mental Model Landmarks

Review

I started this letter by encouraging you to join me in thinking about a wide variety of problems. I spent a couple of pages looking at objectives, priorities, and perceptions. Then I introduced the idea of root problem types as one possible framework in which to think about problems; as a tool to help compare, contrast, and classify them; and as a means for generalizing about efficient solutions. I went on to look at decision making techniques, quantitative comparisons of problems, systems analysis, and world models. I talked a lot about making good decisions and the importance of maintaining high quality models of the world around us. To that end, I advocated building computer models that are better than the pioneering ones we have today. Someday I'd like to see models that improve on today's models by being more complete, more detailed, more accurate, more accessible, more extensible, more queriable, and more easily customized.

Mental Models

Unfortunately, in the here and now we don't have sophisticated computer models, and still we must try to make the best decisions we can—the difference between a good decision and a bad one will almost certainly cost us children's lives. Until good computer models are readily available we'll have to make do with the models that we have today—the mental models we carry in our heads. We can't hope to make our mental models detailed or complete, but it's important to try to make them reasonably accurate at the coarsest levels. The major landmarks of the real world terrain of human problems should be represented by major landmarks in our perceptions and our mental models. We should all be able to answer simple questions about the general lay of the land—what the largest problems are, whether or not they're readily solvable, and what can and is being done to solve them.

Objectives

Here in the second half of this letter I want to take some time to focus on the most significant and most under-represented features of today's world. This section represents my capsule summary of the major landmarks of the terrain of human problems. My objective here is simply to educate and inform, and to draw your attention to what I think are the largest, most important features that shape the human world. Here's a quick list of the four landmarks that I'll focus on in the coming pages:

Landmark #1—soil erosion, population, and population momentum,
Landmark #2—the small cost of solutions and the continuing large cost of military spending,
Landmark #3—wealth and poverty, and
Landmark #4—government.

Bottom Line

We must build our own mental models of the world, and the burden falls on us to try to make them roughly accurate at the crudest levels.

My Grandmother's Soil — Landmark #1

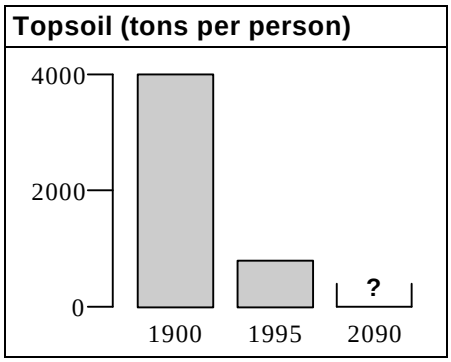
Enduring

My grandmother, Lillian Cottrell Deibert, was born in 1900 on a farm in Marshall County, Kansas. Today my grandmother is almost 100, living a happy, healthy life on a farm in Marshall County, Kansas. Her farm produces wheat, milo, and soybeans, and she and her business partner conscientiously guard the soil against erosion. Without topsoil, the land would no longer be a prolific source of food.

Fleeting

When my grandmother was born in 1900, there were about 1.6 billion people on the face of the planet. Today there are more than three and half times as many, around 6 billion. (About 5.8 billion in 1996, 5.9 billion in 1997, and 6.0 billion in 1998, according to 1994 United Nations predictions.)

When my grandmother was born the earth probably had over 6,000 billion tons of cropland topsoil, which averaged out to about 4,000 tons per person. Today the earth probably has less than 5,000 billion tons of cropland topsoil, which averages out to maybe 800 or 900 tons per person. Every year we're losing more topsoil to erosion, contamination, desertification, and urbanization.



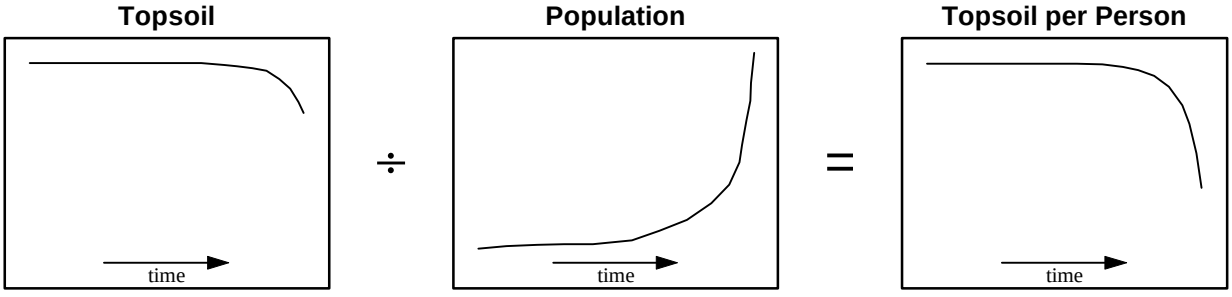
In recent years the population has been growing by about 93 million people per year, while soil erosion claims an estimated 24 billion tons of topsoil from our farmland. We have every reason to expect that for the rest of this decade there will be increases in both the rate of population growth and the rate of topsoil loss. What happens in the next decade will depend greatly on what you and I do this decade.

> The soil is the one indestructible, immutable asset that the nation possesses. It is the one resource that cannot be exhausted; that cannot be used up.
> — the U.S. Bureau of Soils, 1909

> If you think what exists today is permanent and forever true, you inevitably get your head handed to you.
> — John Reed, Chairman of Citicorp

Components

So what's the problem here—too little topsoil, or too many people? Well, right now, neither. For now, we have enough topsoil per person. The problem is trends—topsoil is declining rapidly and population is growing exponentially. Topsoil loss is serious, but it's population growth that accounts for the majority of this century's dramatic fall in topsoil per person.



The topsoil situation is alarming, but I don't think that we'll ever run out of topsoil. As we begin to run recklessly short of topsoil we'll take two simple steps to adapt—we'll stop having as many children and we'll get more serious about soil conservation. Early advocates of these two behaviors will help to smooth the transition.

Exercise

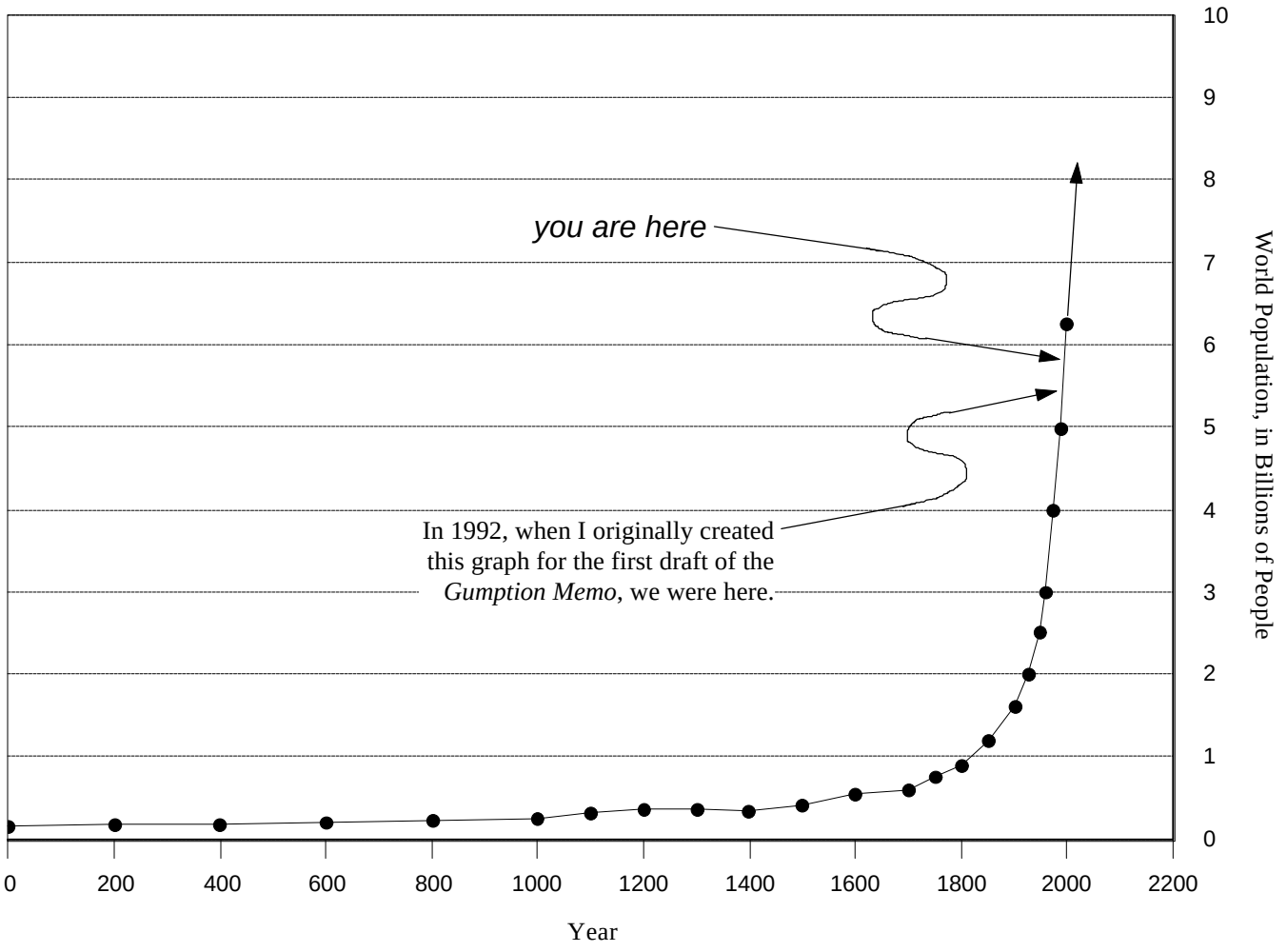
Run an experiment. Conceive a child today. Wait patiently. When your child is 50, see whether the world supply of topsoil is still sufficient to feed the world supply of people.

Alternatively, before deciding to conceive a child, take a month off from work to analyze the state of the world. Write a report summarizing your estimate of probable living conditions during your child's lifetime.

Bottom Line

Topsoil per person is one vital sign that can be a useful indicator of the state of the world. Every high school graduate should have an idea of how much there is and how fast it's going.

Population



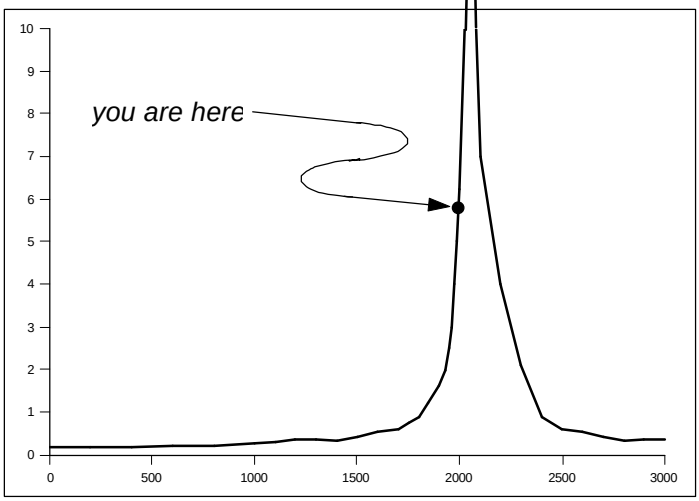
Population On the previous page I talked about topsoil and the trends that have reduced the amount of topsoil per capita to less than a quarter of what it was when my grandmother was born. Part of the topsoil problem is that in the last 95 years we've lost perhaps 25% of the world's cropland topsoil. But population is by far the larger part of the problem. World population is now more than 350% of what it was in 1900.

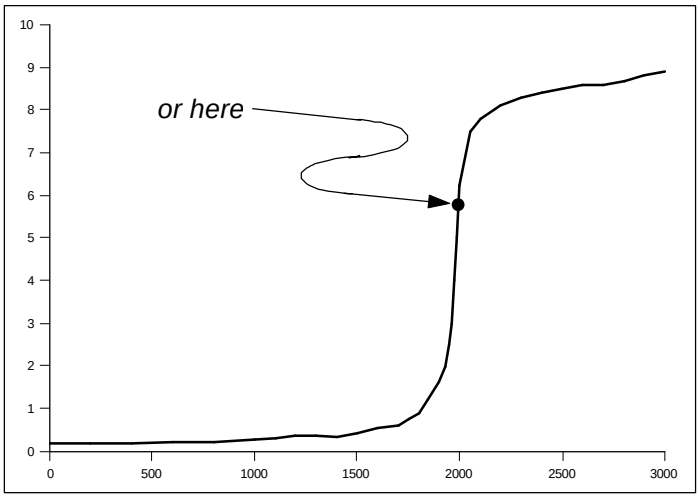
Topsoil is just one natural resource strained by our enormous population growth. As I mentioned in the previous section, almost all ecological problems are partially population problems. Together, the 6 billion of us are bringing about enormous changes in the world—the growing deserts, receding rain forests, eroding soils, vanishing species, and continuing shortages of food, water, and energy. With planning and forethought, we could stabilize world population at 8 billion by the year 2050. Or, without planning and forethought, we could allow population to reach 14 billion. These alternative population scenarios imply vastly different prospects for the people of the earth. For example, in terms of per capita greenhouse gas emissions 35 years from now, a smaller population growing toward 8 billion would yield about 25% less total emissions than a larger population growing toward 14 billion. This would have as much impact on carbon dioxide emissions as eliminating deforestation entirely.

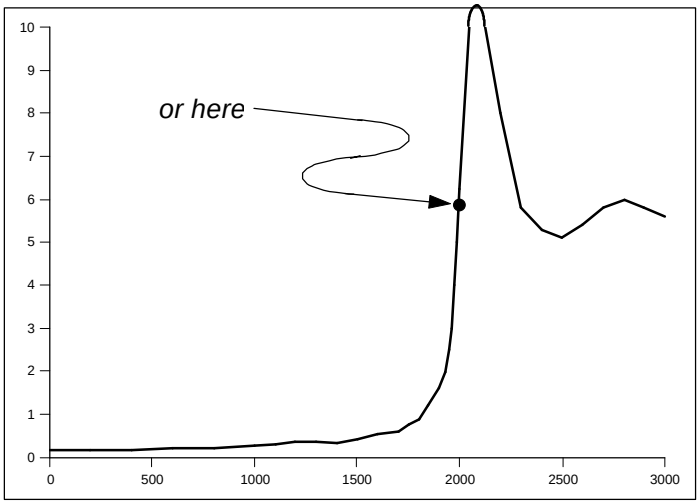
People in both industrial countries and developing countries need to take responsibility for lessening population pressures. The populations of industrialized countries are responsible for the largest proportion of resources consumed and waste produced. The people of these nations are overwhelmingly responsible for acid rain and damage to the ozone layer, and for about two-thirds of global warming. In developing countries the combination of poverty and population growth is resulting in wide-spread deforestation and land degradation. Reckless population growth is a problem that requires the attention of people in both industrial countries and developing countries.

Bottom Line Overpopulation is one of the world's most serious problems and is one of the roots of a great deal of human suffering. We need to begin to seriously address this problem. Soon.

Population Scenarios







No one knows how many people the earth can accommodate. Some people doubt that the earth, over the long run, can even sustain a population of 4 billion, which we exceeded back in 1974. Many people would like to see population growth drastically slowed, with the hope of leveling off the world population at 8 or 10 billion.

Scenario 1—Things get ugly

Some people believe the world is in danger of entering a positive feedback loop from which it will be impossible to escape. The CO_2 already in the atmosphere in 1993 slowly but surely begins to cause global warming. As the oceans get warmer they stop absorbing CO_2 at their present rate. More CO_2, more global warming. More global warming, more CO_2...

At the same time, population is rising out of control, forests are being cut at an increasing rate, and fertile land is being turned to desert. By 2030 the world is trapped in an unavoidable downward spiral. Within the next couple of centuries the ecosystem is destroyed (changed beyond recognition) and the human population plummets.

Scenario 2—Problem, what problem?

Some people believe our environmental problems have been grossly overstated. They assert that as the human population nears the carrying capacity of the planet, people will come to realize this and naturally reduce the number of children they have.

Other people believe that within the next century we will colonize space, and billions of people will be able to leave the planet to find their fortunes in the stars.

Still other people believe that new technologies will make it possible to greatly increase the carrying capacity of the planet, while simultaneously increasing everyone's personal wealth. This new-found wealth will in turn make people less inclined to have many children, and population will level off.

Scenario 3—Voluntary Restraint

Some people believe that the Earth can support a population of 8 or 10 billion, at least for a little while. These people think that this could be done with current technology, relying on global cutbacks in beef production, a reallocation of farmland to wheat and rice and soybeans, decreased energy use and increased energy efficiency.

In time, with an unavoidably raised awareness of the problem, the population can be slowly and painlessly brought back to a more tractable level. New technologies or new political systems will make it possible to sustain a population of many billion people for centuries to come.

It's impossible to predict which of the three scenarios on the previous page will come to pass, but it is clear that overpopulation is one of our most serious problems, and a problem which will get worse before it gets better. We do understand a few important aspects of population growth, which should get more media attention than they do.

Population Basics

Population Growth Rate

The human population was roughly 5.7 billion in 1995. About 149 million children were born that year, and about 56 million people died, which means the population grew by 93 million. This represents a *growth rate* of 1.6 percent (93 million / 5.7 billion). The growth rate of the human population has been roughly the same for many decades.

Exponential Population Growth

The human population grows in proportion to its size—the population in any given year is equal to one plus the growth rate, times the previous year's population. Anything growing in proportion to its size is growing *exponentially*.

Doubling Time

Any population growing exponentially has a fixed *doubling time*. If the human population grew by 1.6% every year, then in about 40 years the population would double in size. And indeed, the world population did double in size in the 37 years between 1950 and 1987. Unless we slow the growth rate the population will double again in 40 years and when I'm in my seventies the world will have 11 billion people.

Zero Population Growth (ZPG)

To maintain the population at a given level we must have a population growth rate of 0%, commonly called *Zero Population Growth* (ZPG).

Replacement Reproduction

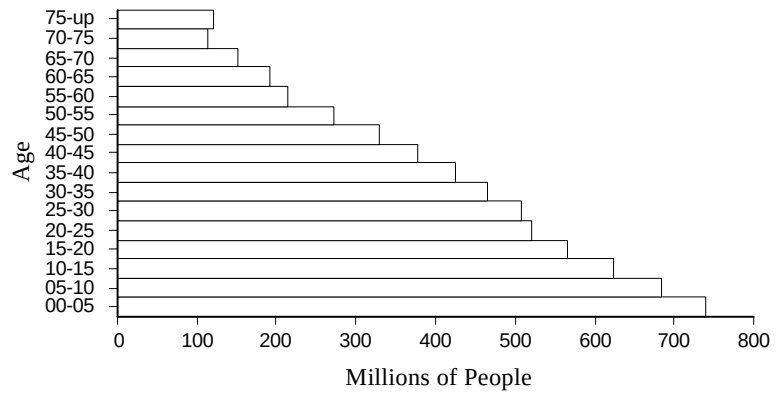
In order to stop population growth we need to achieve *replacement reproduction*, which occurs when the average couple has just two children who survive to have children of their own. Unfortunately, achieving replacement reproduction doesn't immediately yield Zero Population Growth, because of *population momentum*.

Population Momentum

This next bit isn't so obvious. If you can achieve replacement reproduction, why doesn't the population stop growing? In the long run the population will stop growing, but not immediately. Why not? Because it's mostly young people who have babies, and mostly old people who die. So if the population has a high proportion of young people—as it has now—then even after replacement reproduction is achieved, many babies will be born for every old person who dies.

Population Distribution

Projected age distribution of the world's population in the year 2000



In 1989, 40% of the population of the average less-developed nation was under fifteen years of age, and estimates indicate 40% of all 14-year-old girls alive today will be pregnant at least once by the age of 20. Over a billion young people in the world have yet to enter their prime reproductive years. Even if we were to achieve replacement reproduction soon—it would take another 50 or 60 years to achieve Zero Population Growth.

Bottom Line If we want to stabilize the world population at 8 billion in 50 years we need to start working toward that goal immediately.

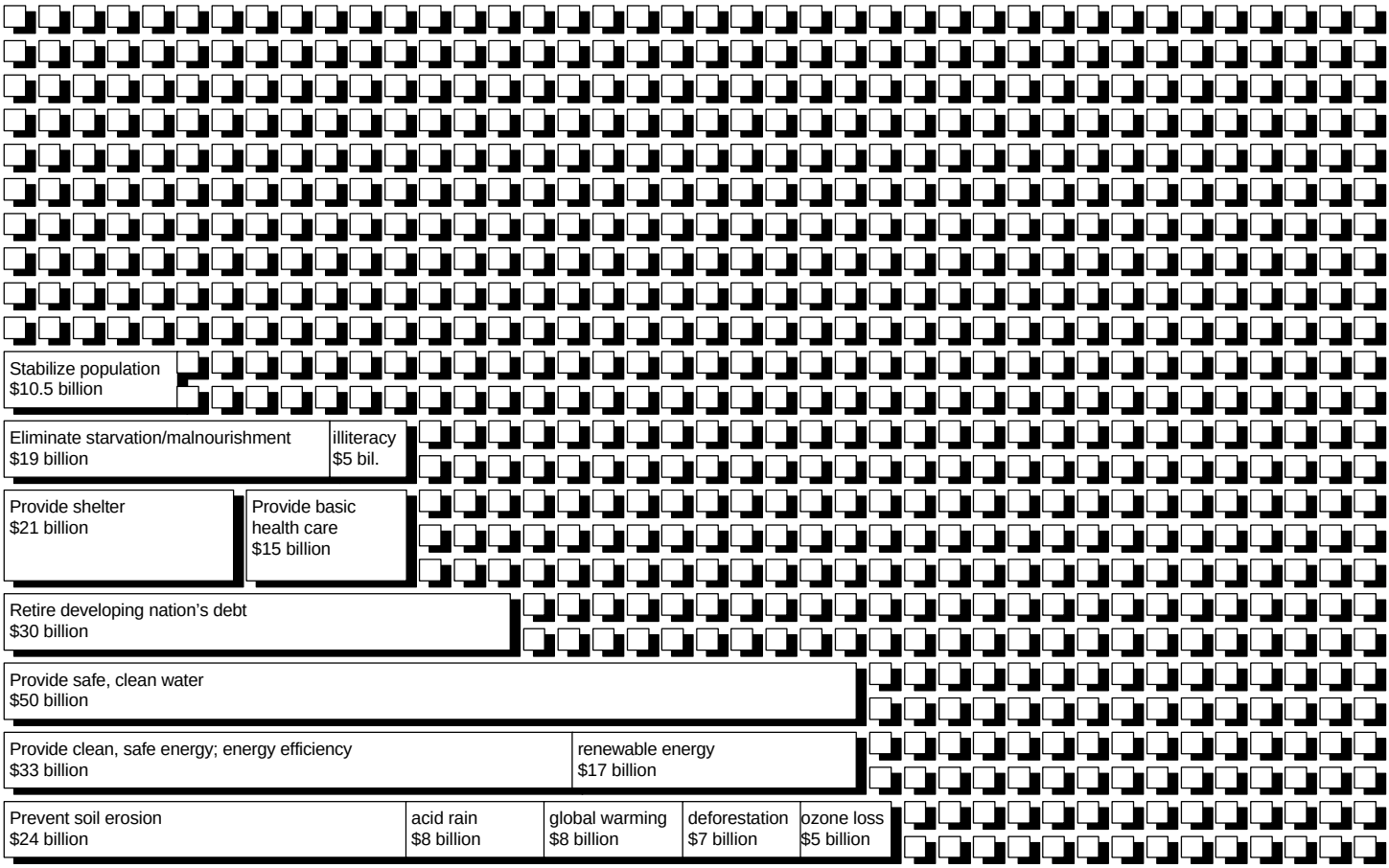
What the World Wants — Landmark #2

Many big world problems are cheaply addressed, and that simple fact is what I want to present here as my second under-recognized major landmark in our mental models of the world.

The Chart

This chart shows the estimated annual costs of some suggested global programs. The whole graph represents the annual world military expenditures—about one trillion dollars. Each little box is one tenth of one percent of annual world military expenditures—about one billion dollars. The boxes near the bottom show the cost of suggested programs. The combined total cost of all 14 programs is about 25% of the world's annual military expenditures. The chart is a few years out of date, and the budgets are optimistic estimates for minimal programs, but I think the chart still gives you a good ballpark sense of just how cheaply our seemingly overwhelming problems could be addressed.

This chart is based on (and is materially identical to) a datasheet called *What the World Wants*, copyright 1991 by the World Game Institute, and it is included here with the permission of the World Game Institute. Full explanatory text for the 14 programs shown on the chart is presented in *Doing the Right Things*, available from the World Game Institute, 3215 Race Street, Philadelphia, PA 19104.



— Total chart = total annual world military expenditures: $1 trillion

— One square = one-tenth of one percent of world military expenditures: $1 billion

> It is time we steered by the stars, not by the lights of each passing ship.
> — General Omar Bradley

Bottom Line

For as little as $260 billion per year, about a quarter of the world's annual military budget, we could address 14 major world problems, including starvation and population growth.

Background

Along with my concerns about population, one of my greatest concerns is the distribution of wealth in the world, and particularly the distribution of wealth among children. I believe all children should start out with a reasonable opportunity in life. I would like to live in a world where there aren't gross systemic imbalances in the levels of food, education, and health care available to children of different countries.

> The consumer class—the 1.1 billion members of the global consumer society... enjoy a life-style unknown in earlier ages. We dine on meat and processed, packaged foods, and imbibe soft drinks and other beverages from disposable containers. We spend most of our time in climate-controlled buildings equipped with refrigerators, clothes washers and dryers, abundant hot water...
>
> The world's poorest billion people are unable to provide themselves with an adequate diet; perhaps half of them are so short of calories that they are likely to suffer stunted growth, mental retardation, or even death. ...they drink water that is often contaminated with human, animal, and chemical wastes. If hunger doesn't kill them, the water may: waterborne diseases account for 80 percent of illness in the Third World, according to the World Health Organization.
>
> — Alan Thein Durning, *How Much Is Enough?*

Perceptions

In the previous section, I introduced Ronald Howard's paper about MicroMorts and people's perceptions of risks. The paper concluded that people's perceptions of risks are not consistent with the real risks, and as a result their behavior is not rational. The same can be said of perceptions about wealth and poverty. As with population, I am concerned not only with the situation itself, but also with people's perceptions of it.

Most of the people in my life—my friends, family, and colleagues—are doing well financially. By global standards these people are downright rich, and even by American standards they're better off than most. But despite their exalted position, I find that these people describe themselves as "poor" far more often than they describe themselves as "rich." And when they do acknowledge their wealth, they frequently describe themselves as "middle class" or "upper-middle class," when in fact "rich" would be more accurate.

This tendency disturbs me for two reasons. My first concern is that if we don't recognize how well off we really are, then we may fail to fully appreciate just how poor much of the world is, and how much work needs to be done to provide reasonable living conditions for all people. My second concern is that if the rich people don't see themselves as rich, then they may fail to recognize that they have tremendous power to solve world problems, and they may be more inclined to view stewardship of the world as someone else's responsibility.

Comparisons

I think it's easy to fall into the trap of comparing yourself to people who have more than you do rather than ranking yourself objectively among all people. I had a friend back in high school who was moderately well off and was extremely concerned about social problems. He couldn't understand why people who were well off financially didn't do more to help those who weren't. One day when he and I were out running, we passed an Audi Quattro and he remarked, "That could have been a Honda Civic and a college education." (Actually something of an overstatement, but that's what he said.) Six years later he was driving an Audi Quattro himself, and although he still spoke passionately about the importance of helping people, he thought the majority of that responsibility should be borne by the rich, and he didn't see himself as rich. That's a trap I never want to fall into.

$120 Ties

Back in 1992 I had the pleasure of working for one of the brightest and most able people I've ever met. The project he ran had been granted an unlimited budget, of which he was spending maybe $10,000 a day. Surprisingly, if you asked him whether he thought he was a powerful person he would say no. He wore $120 neckties and he was well aware that his income was within the top 1% of all incomes in the U.S., yet he didn't really consider himself rich. He'd grown accustomed to his position in life, and had begun to lose some of his perspective.

Like my boss, I think most of us have trouble keeping everything in perspective. I hope this section of the letter can serve as a tool to help keep an objective outlook.

Bottom Line

Wealthy people often have inaccurate perceptions of their level of wealth—they often don't realize just how well off they are.

Exercises

The next few pages are designed to help you examine your perceptions of how well off you are. The first exercises inquire about your perceptions, and the later exercises test those perceptions.

Exercise

On a scale from 1 to 10, how rich do you think you are? _____

What percentage of the U.S. population is poorer than you are? _____

What percentage of the world population is poorer than you are? _____

Test Your IQ

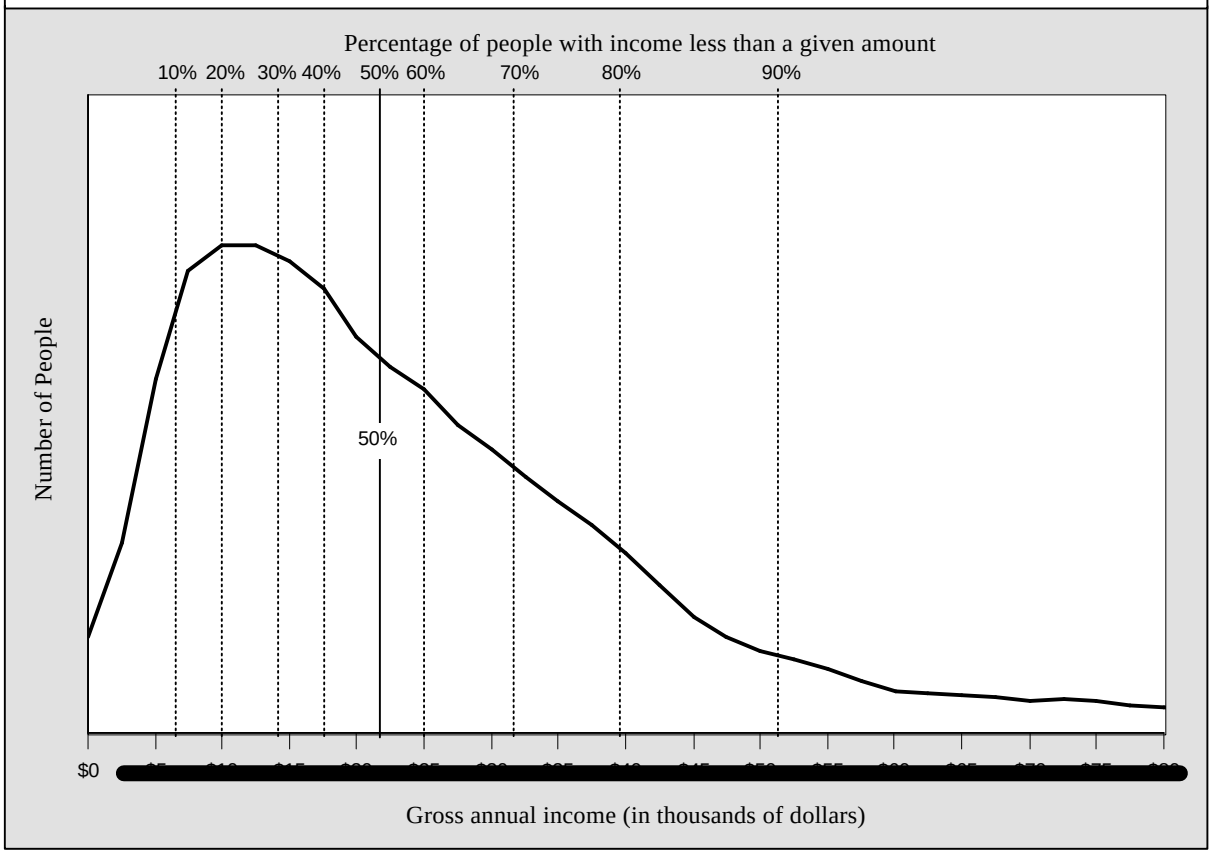
The graph below, *Income Distribution in the United States in 1992*, is here for you to test your IQ—your *income quintile*. Do you think your income is in the top 20% of all U.S. incomes? The bottom 20%? The middle? In the exercise above, what percentage of the U.S. population did you guess were poorer than you?

Exercise

The graph below shows the distribution of income among taxpayers in the U.S. It shows that generally speaking not too many people have really high or really low incomes, and most people have incomes that fall somewhere in the middle. The way you'd normally use this graph would be to locate your gross annual income on the scale at the bottom and then draw a vertical line to the top of the graph to find what percent of American taxpayers earn less than that amount. But you can't do that on this graph because I've drawn a big black line across the income scale at the bottom. So you're going to have to guess.

Draw a vertical line on the graph where you think your income is. If you're married, count your income as being one half of the sum of your income and your spouse's income. According to your estimate, what percentage of Americans earn less than you do?

Income Distribution in the United States in 1992



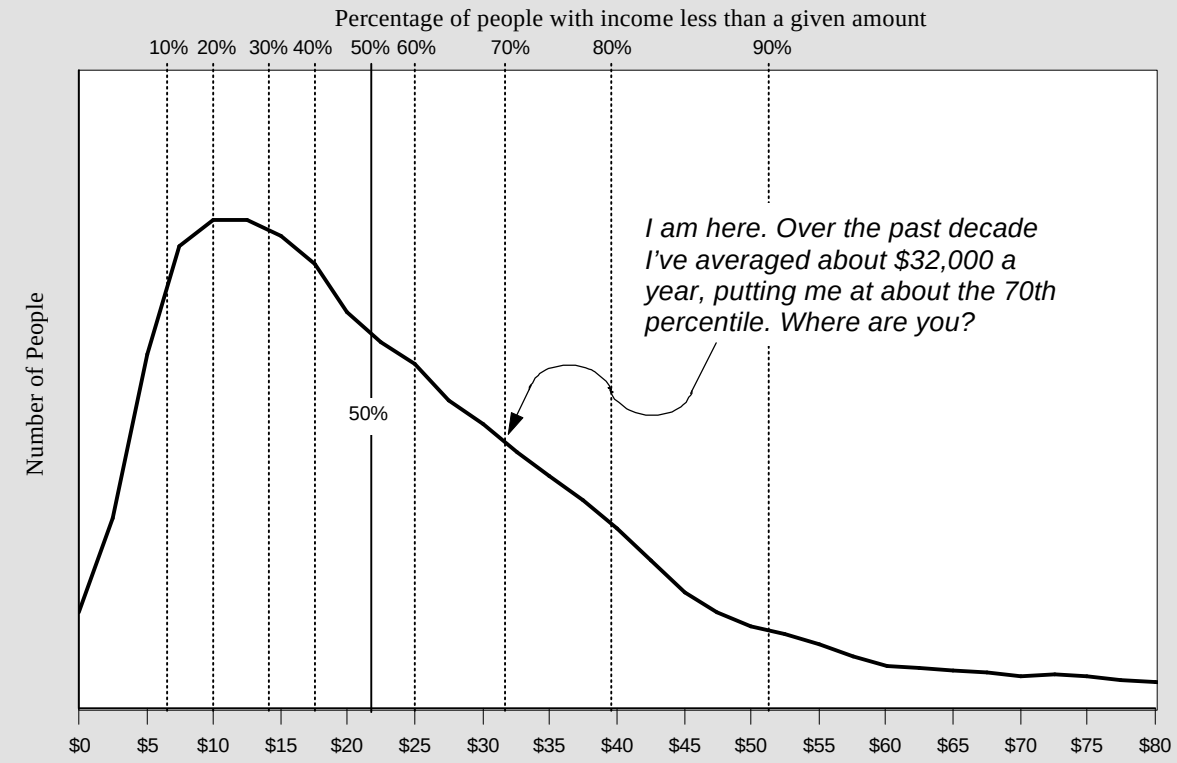
Bottom Line

Take a minute to guess how your income compares to the incomes of other Americans.

Check Your Guess

Okay, now check the guess that you made on the last page. Here's the same graph again, but this time with the scale on bottom. Find your gross annual income on the scale at the bottom and draw a vertical line to the top. What percentage of Americans earn less than you do? Compare this result to the answer you gave in the exercise on the previous page. Were your perceptions accurate?

Income Distribution in the United States in 1992



Think Globally

By now you should have a pretty good idea of where you fit in among Americans. Now let's move on to take a global perspective.

Exercise

Think a little bit about the things you take for granted—clean drinking water, refrigerated food, affordable birth control, nutritionally sufficient food, and perhaps even convenient access to a car, a TV, and a phone. Fill in the chart below to show which of these four things you have in your household, how many of each of them you think exist worldwide, and what portion of the world population has access to them.

	TV	phone	car	fridge
Do you have one of these in your household?	____	____	____	____
How many of these do you think exist in the world?	____	____	____	____
How many people do you think have one in their household?	____	____	____	____

Finding authoritative answers to these questions is left as an exercise for the reader. Try going to a local library and asking a reference librarian for advice about where to find this information. While you're at the library, check out some of the books that I recommend in the appendix.

Bottom Line

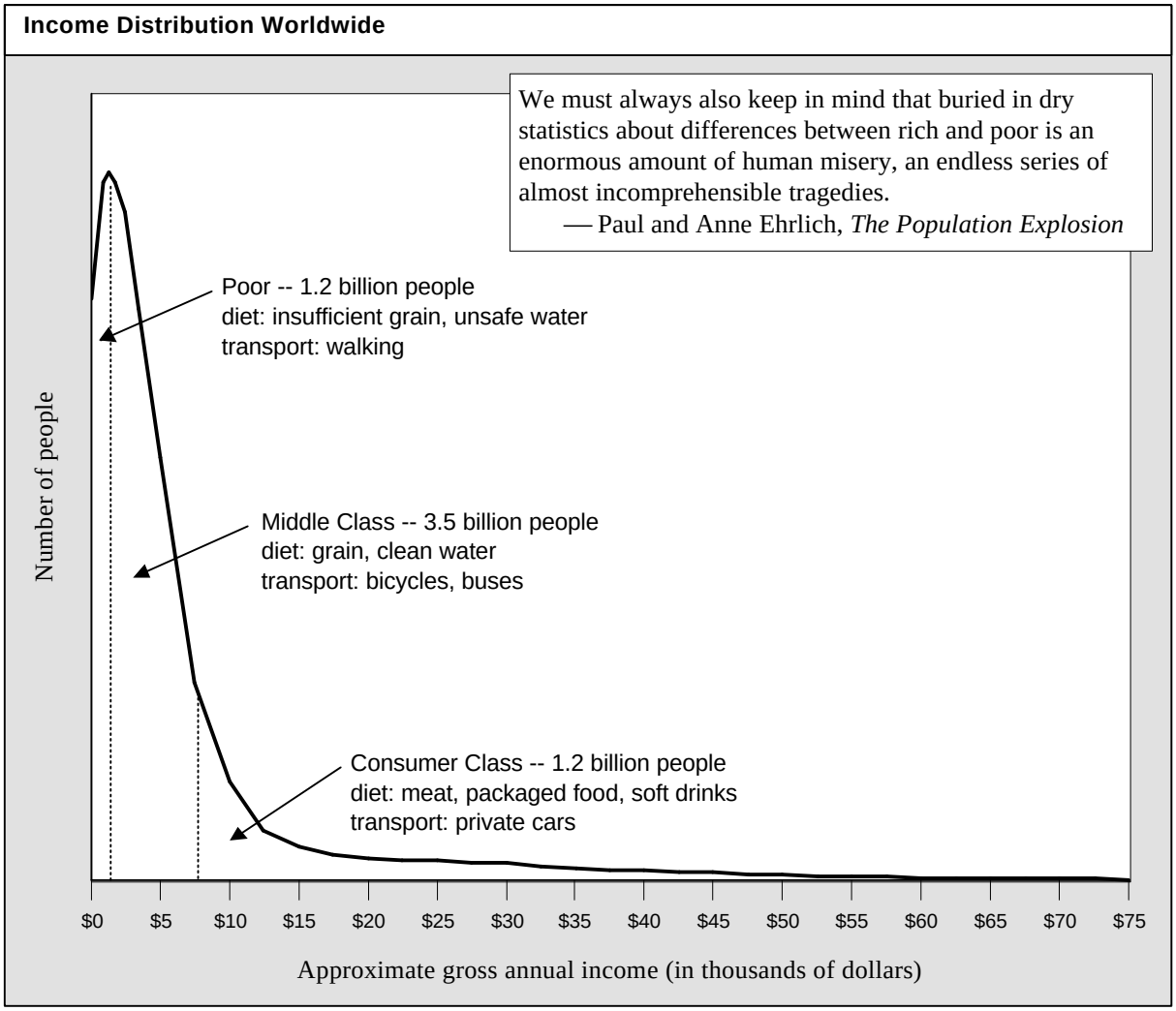
Check your guess from the previous page. What percentage of Americans have income levels below yours? How accurate was your perception of where you stand?

Global Income Levels — Landmark #3

Rich & Poor

The graph below shows a rough approximation of the distribution of income worldwide. Most people live on an annual income between $750 and $7,500, which is generally enough to provide a good standard of living. On the left edge of the graph, over a billion people live in absolute poverty, lacking sufficient food and clean water. The right side of the graph shows the consumer class, where over a billion people like me enjoy much more wealth than we need to get by, consume resources at an alarming rate, and consistently fail to take action to address world poverty.

Income Distribution Worldwide



Vital Signs

This small sampling of statistics may help give you a better feel for the magnitude of world poverty:

- Some 1.2 billion people lack water safe to drink—one out of five people.
- About 36,000 children die each day, largely for lack of food and clean water—14 million per year.
- 1 million women die each year from preventable reproductive health problems.
- About 1 billion adults, one in five, cannot read or write—70% of these adults are women.
- About 130 million children of primary school age are not in school—70% of these kids are girls.
- One in three children is malnourished.
- 100 million people in the world are homeless.
- 500 million people eat too much, and another 500 million people eat scarcely enough to stay alive.

Bottom Line

There is tremendous inequity in the relative levels of wealth worldwide. Twenty percent of the world lives in absolute poverty, while another twenty percent lives in stunning wealth.

For the past ten pages I've been outlining what I view to be the major landmarks in the terrain of human problems. So far I've touched on population and natural resources, wealth and poverty, and the surprisingly small cost of solving many "big" problems. The last landmark I want to bring up is government.

Worldwide, the governments we've built for ourselves have become one of the most powerful human forces on the planet, second only to the collective action of individuals. Fortunately, it's widely recognized that governments wield enormous power, and a great deal of our day-to-day news involves governments and government actions. Unfortunately, on the whole, the governments of the world are doing far less than they could to address world problems. I have three general criticisms of governments—oppression, nationalism, and waste—each of which I'll outline separately below.

Oppression

My greatest concern is over governments which intentionally oppress people, in the way so many autocratic governments seem to do. Stalin's government was a prime example—a government that intentionally killed millions of its own citizens, tortured subversives, obstructed travel into and out of the country, and actively repressed freedom of speech, assembly, and religion. Though perhaps not as bad as Stalinist Russia, today's North Korea is another example of an unrepresentative government—a government which simply isn't looking out for the best interests of its citizens.

Democracies tend to be far better at meeting the needs of the people, and I'm pleased to see the current world trend toward democracy. In terms of how it treats its own citizens, I believe the United States government is one of the best in the world. Our constitution is idealistic, practical and operative; our democratic process is regular and reliable; and our elected representatives are alert and responsive to the desires of their constituencies. We enjoy freedom of expression, freedom to travel, freedom to gather, freedom to practice our religions, and a host of other civil liberties.

Nationalism

My second general criticism is of government actions that promote nationalism, unnecessarily widening the cracks of tribalism fracturing the world's people. Like all forms of tribalism, I think nationalism arises from fundamental human nature—an instinct to band together in the face of adversity. I consider tribalistic instincts to be comparable to other basic human instinctive reactions, like instinctive violence and instinctive sex drive. At some point all these instincts were essential to human evolution, but in civilized society they must be carefully moderated and channeled. We still have avenues of expression for violent behavior, but we also have strict laws, customs, and taboos that help to curb rape, murder, child pornography, etc.

But we have no such cultural defenses against nationalism. We routinely encourage patriotism, team spirit, and concern for the interests of *our* group before all others. Nationalism encourages us to look at the world as a zero sum game—a contest in which some win and some lose, and the more *they* win, the more *we* lose. We seem to think that if the Japanese are getting richer it means we're getting poorer. Sometimes that may be true, but often life is a positive sum game in which all players grow richer together. The world today is fabulously richer than it was just a few centuries ago, and people all over the world are working hard, creating wealth. That work should be applauded and rewarded, wherever it is done.

Our governments are not responsible for creating nationalism, but they often encourage it and play off of it. At one level individual officials—presidents, generals, and representatives—publicly call for patriotism and represent other nations as mock adversaries. On a second level, our very system of government promotes nationalism, by making citizenship more of a birthright than a free choice, by valuing the lives of citizens more highly than non-citizens, and, through taxation, by forcing those values upon the people. We would all be better off if governments did more to promote free trade, free travel, and economic and military interdependencies. What would the world look like if our governments acted as catalysts in the global melting pot, rather than membranes?

Bottom Line

Our governments wield enormous power—power that both creates and prevents human misery. We must try to govern ourselves with less oppression, nationalism, and waste.

Waste

My third criticism, and the one most pertinent to the U.S. government, is of economic waste. Large, centralized organizations are notoriously difficult to manage efficiently, and in today's economic climate monolithic organizations like GM, IBM, and the USSR are faltering, failing, dissolving, and re-forming into their smaller, more responsive, semi-autonomous components. More than anything else this represents a long overdue switch from wasteful planned economies to more efficient, regulated-market economies. Years ago someone told me that the U.S. military was the second-largest planned economy in the world, behind only the USSR. Now there is no USSR and the former Soviet states are moving to free market economies. I wonder, is the U.S. military machine, built to keep the world safe from communism, now itself the largest planned economy in the world?

Here in the U.S., the government causes economic waste in two ways—with its taxation policies and its spending policies. I'll start with taxation. Any tax has two effects—it generates revenue for the government and it discourages certain behavior. The Clinton administration has pushed for a BTU tax, carbon tax, or significant gas tax in an effort to reduce both pollution and excessive energy dependence. But these measures have not been popular, and currently we don't have significant pollution taxes, despite the fact that we want to discourage pollution. Instead we try to control pollution through regulation, like California's law that 10% of all corporate auto fleets must be electric within a decade. The one thing we do tax heavily is income, with capital gains tax, income tax, social security tax, etc. That's counterproductive—we shouldn't tax income because we don't want to discourage income, and we shouldn't tax employment because we don't want to discourage employment. Income tax is beneficial because it raises revenue, but any tax raises revenue, so we might as well only tax things we want to discourage. Ideally, I'd like to live in a place that replaced income tax with taxes like carbon tax, pollution tax, heavy metals tax, land abuse tax, aquifer reduction tax, road use tax, and logging tax. In addition to systematically taxing the wrong things, current U.S. tax policy is just plain messy, with inconsistent, arbitrary policies that at times encourage businesses and individuals to arrange their affairs so as to minimize tax exposure rather than to create wealth. One thing we clearly need is a simpler tax policy.

The second way that the U.S. government causes economic waste is by allocating resources poorly. The most obvious case of this is military spending. The cold war is over, yet we still allocate over 250 billion dollars per year to military spending, several times as much as Germany, Japan, China, Iraq, Iran, Cuba, Libya, and Panama *combined*. The U.S. soldiers in the Gulf War were, on average, safer than if they'd stayed in the U.S., while average life expectancy for a black male born in Harlem is lower than the life expectancy of a boy born in Bangladesh, one of the very poorest countries in the world. These problems can only get worse unless we stop squandering urgently needed resources on superfluous military might.

> Every gun that is made, every warship launched, every rocket fired signifies in the final sense, a theft from those who hunger and are not fed, those who are cold and not clothed. The world in arms is not spending money alone. It is spending the sweat of its laborers, the genius of its scientists, the houses of its children.
>
> — Dwight D. Eisenhower, 1953

> Our government has kept us in a perpetual state of fear—kept us in a continuous stampede of patriotic fervor—with the cry of grave national emergency... Always there has been some terrible evil to gobble us up if we did not blindly rally behind it by furnishing the exorbitant sums demanded. Yet, in retrospect, these disasters seem never to have happened, seem never to have been quite real.
>
> — General Douglas MacArthur, 1957

Bottom Line We should tax consumption, not income, and we should drastically cut military spending.

Popular Control

What should we do about these major deficiencies of government? I recommend a balance of two approaches: (1) try to fix the problems, and (2) try to work around them. The steps toward fixing the problems of government are familiar ones—writing letters, demonstrating peacefully, being an informed citizen and voting whenever possible, supporting alternative candidates, and supporting organizations like Amnesty International and the ACLU (American Civil Liberties Union). Worldwide, individuals need to try to rein in their governments—try to make them less oppressive, less provincial, and more responsive to the needs of the people.

> Reason and free inquiry are the only effectual agents against error... They are the natural enemies of error, and of error only... If it [free inquiry] be restrained now, the present corruptions will be protected, and new ones encouraged. Was the government to prescribe to us our medicine and diet, our bodies would be in such keeping as our souls are now. Thus in France the emetic was once forbidden as a medicine, the potato as an article of food. Government is just as fallible, too, when it comes to systems in physics. Galileo was sent to the Inquisition for affirming that the earth was a sphere; the government had declared it to be as flat as a trencher, and Galileo was obliged to abjure his error... It is error alone which needs the support of government. Truth can stand by itself.
>
> — Thomas Jefferson, in a passage from *Notes on Virginia*

Independent Action

Secondly, we must not rely on our governments to solve our problems. Here in America I think we've increasingly come to view our government the same way small children view their parents—as the single source of solutions to all our problems, obviating all need for individual responsibility. We blindly trust the government with our tax money and our welfare, and then when things don't go smoothly we turn around and use the government as a scapegoat—"it's not our fault, the government should have taken care of that."

The media brings us images of needless tragedy around the world: war and poverty, oppression and ecological abuse. With a sense of detached dismay we watch the reports come in, and sitting in our recliners, sipping our Cokes™, we say with lazy conviction, "That's intolerable! *They* should be doing something to stop that." We should not, and cannot, rely on the government to solve all our problems.

We cannot afford to wait for our governments—we must learn to solve problems ourselves. We must practice taking personal responsibility and showing individual initiative in addressing major problems. The Gumption Trust is one small initiative—important and significant, but a drop in the bucket. All over the world concerned individuals are working hard to make the world a better place. These are the people to whom we should give our trust and allegiance.

> Governments could go on talking from now to doomsday. We must prevent the destruction of western civilization.
>
> — Albert Einstein

Bottom Line

We should do our best to make our governments behave benevolently, broad-mindedly, and responsively, but in the end we must take personal responsibility for solving our problems.

The U.S. Budget — Landmark #4

What Do You Think?

On the previous page I encouraged you to be an informed citizen and take an active role in the affairs of government. Taking an interest in the budget of your government is one of the many avenues you might explore. The chart below shows a rough breakdown of the estimated 1995 federal expenditures, along with my own off-the-cuff suggestions about where we should be spending our money. How would you allocate the federal budget? What programs would you add, and what would you cut?

Your Goals		1995 Outlays		My Goals		Budget Item
billion	%	billion	%	billion	%	
		273	17.5%	136	8.7%	DOD, DOE defense activities, and international security assistance ⇩
		39	2.5%	39	2.5%	Veterans benefits (income security, housing, health care, education, etc.)
		12	0.7%	12	0.7%	Foreign affairs and international cooperation
		4	0.3%	8	0.5%	International development and humanitarian assistance ⇧
				12	0.8%	International family planning initiative ⇧
				25	1.6%	International safe water initiative ⇧
				3	0.2%	International literacy initiative ⇧
				8	0.5%	International health care initiative ⇧
				20	1.3%	International food and shelter initiative ⇧
		1	0.1%	12	0.8%	Energy conservation, emergency preparedness, information, policy, & regs. ⇧
		3	0.2%	1	0.1%	Energy supply ⇩
		19	1.2%	19	1.2%	Nat. resources & environment (recreation, conservation, pollution control, etc.)
		17	1.1%	17	1.1%	General science, space & technology
		14	0.9%	14	0.9%	General government
		17	1.1%	22	1.4%	Judicial, correctional, and law enforcement ⇧
		221	14.1%	221	14.1%	Income security (food, housing, unemployment, retirement, and disability)
		124	7.9%	80	5.1%	Health care (services, research, safety, and health security) ⇩
		156	9.9%	156	9.9%	Medicare
		337	21.5%	337	21.5%	Social security
		54	3.4%	70	4.5%	Education, training, employment, and social services ⇧
		9	0.6%	9	0.6%	Community/regional development
		6	0.4%	1	0.1%	Postal service and other commerce ⇩
		38	2.4%	8	0.5%	Transportation ⇩
		10	0.6%	1	0.1%	Farm income stabilization ⇩
		3	0.2%	3	0.2%	Agricultural research and services
		213	13.6%	213	13.6%	Net interest on debt
				124	7.9%	Debt reduction ⇧
	100%	1,571	100%	1,571	100%	Total

Exercise

Fill in the left hand column on the chart above to indicate your desired level of funding for each of the government activities listed. Photocopy this page and send copies to your elected representatives. To get your congressmembers' names, phone numbers, and addresses, call one of these numbers during business hours and press 5:

Time Zone	**Number**
Eastern	800-347-1997
Central	800-359-3997
Mountain	800-366-2998
Pacific	800-726-4995

Addresses:

President Bill Clinton
The White House
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

Your Senator's Name
U.S. Senate
Washington, D.C. 20510

Your Representative's Name
U.S. House of Representatives
Washington, D.C. 20510

> Politicians usually figure one letter represents about a hundred constituents. People don't realize it, but ten letters to a congressman or senator or governor will often get real results.
>
> — David Siegel, *What Is Worth Doing*

Bottom Line

Think about what you want your government to do, and keep your elected representatives apprised of your opinions.

Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has.

— Margaret Mead

The Next Step

what you can do, and not do, to help make the world a better place to live

The great aim of education is not knowledge but action.
— Herbert Spencer

The best way to predict the future is to create it.
— Alan Kay

We must be the change that we wish to see in the world.
— Mahatma Gandhi

A Call To Inaction

General Inaction

I've spent the last thirty-something pages telling you all about the world's many problems. It's high time I made some concrete suggestions about what to do about them. So what do I think we should do to solve our problems? Well, for starters, *nothing*.

As far as ecological problems are concerned, there is little we need to do. The earth does not need to be saved, it needs to be let alone. We don't need to start restoring the environment so much as we need to stop destroying it. We don't need to take action nearly so much as we need to refrain from taking action. Refrain from logging, refrain from eating beef, refrain from driving cars, refrain from having more than one child, refrain from buying things we don't need, refrain from building armies and fighting wars.

Many social problems could also be alleviated simply by restraint—by refraining from excessive drug and alcohol use, refraining from abusing children, refraining from unprotected sex, refraining from unlawful acts, and refraining from acts of anger, greed, power, and pride.

Of course this is all a gross oversimplification of complex realities. Many problems do require your action, and many behaviors are difficult to voluntarily refrain from. Nonetheless, *restraint* is a good rule of thumb, and a call to inaction is in order.

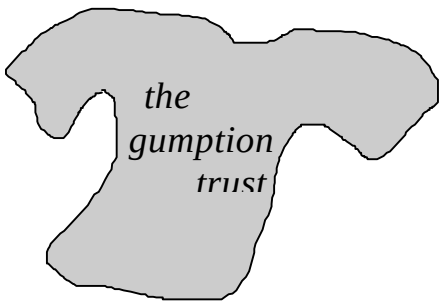
Personal Inaction

Here's a quick list of specific things that you can not-do to help solve world problems.

(1) Don't have more than two kids. Encourage your kids not to have more than two kids.
(2) Don't eat beef.
(3) Don't kill anyone.
(4) Try not to own a car.
(5) Try not to consume more than your fair share of the world's resources.
(6) Endeavor to live cheaply. Set a tight budget for yourself.
(7) Don't mow your lawn.
(8) Refrain from unsafe sex.
(9) Don't use much energy.
(10) Think before you act.
(11) When in doubt, refrain from action.
(12) Live simply so that others may simply live.

Exercise

Greenpeace makes dozens of different T-shirts, earrings, hats, coffee mugs, and key chains. Why don't I make Gumption Trust T-shirts?



Modern society will find no solution to the ecological problem unless it takes a serious look at its life-style.
— Pope John Paul II

In Tennessee there is an old saying: When you are in a hole, stop digging.
— Vice President Al Gore, *Earth in the Balance*

We have met the enemy and he is us.
— Pogo

The single simplest and most effective thing anyone could do to save Earth is to have no more than two children.
— Paul and Anne Ehrlich, *Healing the Planet*

For fast-acting relief, try slowing down.
— Lily Tomlin

It is impossible to give the whole planet the kind of life-style you have here, that the Germans have, that the Dutch have ... and we must face this reality.
— Jose Lutzenberger, Brazil's Secretary of State for Environment

Bottom Line

Refraining from action can be an effective way to help solve serious problems. Think about what things you could refrain from doing to make the world run more smoothly.

A Call To Action

General Action On the previous page I gave examples of particular *inactions* that we can take to make the world a happier place. Here I'm going to talk about *actions*—there are lots of constructive actions we can take too. (For every inaction there is an equal and opposite action?)

You've probably already heard all sorts of ideas about things you can do to solve human problems. You've seen books like *Fifty Simple Things You Can Do To Save The Planet*. You've gotten fliers asking you to recycle. You've had charities call requesting your money. Those calls to action are all good, but I sometimes feel they're simply not enough. Someday I'd like to write a book called *Fifty Much Harder But More Significant Things You Can Do To Prevent Human Misery*. Probably wouldn't be a best seller.

Personal Action Here's a quick list of things that you can do to build a brighter future.

(1) Read. Write. Think. Discuss.
(2) Make a list of actions you can take to make the world a happier place.
(3) Adopt unwanted children.
(4) Volunteer at a local non-profit organization.
(5) Teach yourself about the world, and then teach others.
(6) Write a letter to your friends—tell them what you think.
(7) Listen to your friends—consider what they have to say.
(8) Work hard, and work effectively.
(9) Make more money than you need.
(10) Need less money than you make.
(11) Invest money in social solutions—contribute to organizations that are solving problems.
(12) Think about the long-term, far-reaching implications of your actions.
(13) Question authority. Question assumptions.
(14) Keep asking why.

Sample Action #1

Take an active interest in energy conservation. Some acts of energy conservation cost money or require sacrifice, but many are painless and free. With some you can even turn a profit. Have a look at what I've written about compact fluorescent lightbulbs on the following pages. Replace your incandescent lightbulbs with compact fluorescent ones—it's a simple, easy, profitable step toward a better world.

Sample Action #2

Take half an hour to help me make this a more effective mailing. Mark it up in red pen. What parts offended you? What parts inspired you? Write suggestions. Send it all back to me.

Sample Action #3

Create value, don't make money. When you win a bet in Las Vegas you make money, but not by providing a useful service to anyone—you don't create value. When you rescue the neighbor's cat from a tree you don't make any money, but you do solve a real problem—you create value. Look at your job. Do you solve real problems? Do you create value, or just make money? What can you do to create more value?

If somebody had told me that I would become Pope one day, I would have studied harder.
— Pope John Paul I

If I had only known, I would have been a locksmith.
— Albert Einstein

Bottom Line Don't get tricked into thinking there's nothing you can do to change the world. There's a lot you can do—simple things for starters, and harder things for later on.

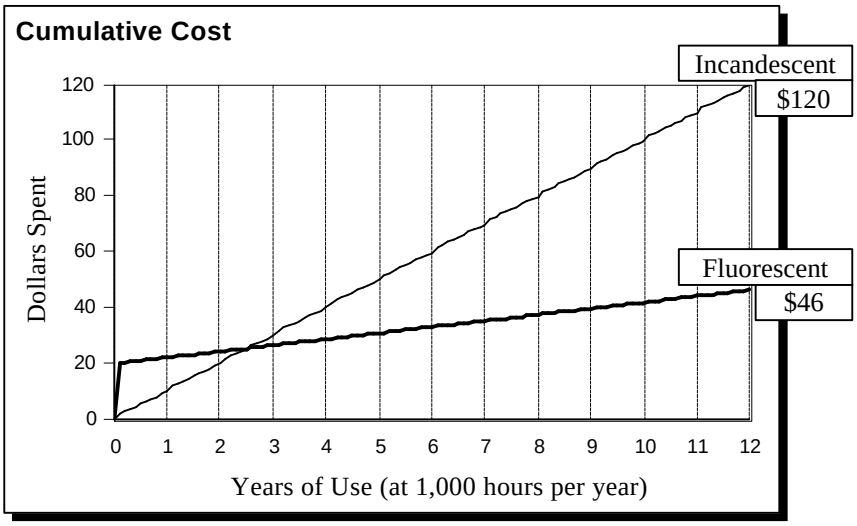
Compact Fluorescent Lightbulbs

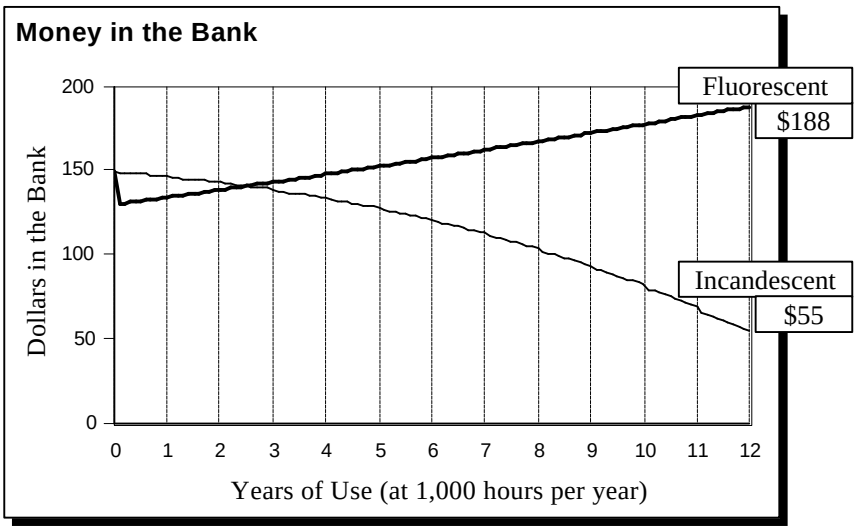
One simple action you can take to make the world a happier place is to replace standard incandescent lightbulbs with modern compact fluorescent ones. Americans, with only 5% of the world's population, consume about 25% of the world's energy. Most of this energy use results in some kind of pollution. Compact fluorescent lightbulbs prevent pollution and also save time, money, and energy. If you replace a single 90 watt incandescent bulb with a compact fluorescent bulb you will:

- save yourself about $130 over the next decade (But that's in the decade-from-now inflated dollars. It's only about $70 in current dollars.)
- avoid having to replace the incandescent bulb when it burns out—11 times
- save about 800 kilowatt hours of energy
- reduce your coal use by about 320 kilograms (700 pounds)
- prevent about 720 kilograms (1600 pounds) of carbon dioxide emissions

If every American household (there are currently 100 million) converted all lamps to compact fluorescents, America would instantly become an energy exporting nation! ... If every human on earth replaced their incandescents with compact fluorescents we could shut down 50 nuclear power plants!

— The Real Goods Alternative Energy Sourcebook, 1991





These two graphs show how much money you could save by replacing a single incandescent bulb with a fluorescent one. The graphs compare a 90 watt, 1550 lumen, incandescent bulb with a 22 watt, 1550 lumen, Lights of America bulb. See the comparison chart on the next page for more details.

The top graph shows the cost of using the two types of bulbs. It assumes that the incandescent bulbs cost about $1 each, the fluorescent bulb costs about $20, and energy costs about 10 cents per kilowatt hour. As you can see, the fluorescent bulb pays for itself after about 2500 hours of use.

The bottom graph is more realistic than the top one. It shows your bank account. You start with $150 in the bank, earning 5% interest a year. Energy costs 10 cents per kilowatt hour the first year but goes up with inflation—5% per year.

In both graphs the incandescent bulb burns out after 1,000 hours, whereas the fluorescent lasts 12,000. The 11 vertical dashed lines on the graphs show where incandescent bulbs burn out and are replaced with new incandescent bulbs. Surprisingly, the cost of each replacement bulb is almost nothing compared to the cost of powering it—you can barely even see the little $1 bumps on the incandescent line where the replacement bulbs are purchased.

Assumptions: Lights of America #2022 compact fluorescent bulb: 22 watts, 1550 lumens, 12,000 hour life span vs. 12 incandescent 90 watt bulbs with 1550 lumens and a 1,000 hour life span each. Energy costs $0.10 per kwh. Coal burns at 0.39 kg per kwh, and creates 2.276 kg of CO_2 per 1 kg of coal.

Compact Fluorescent Lightbulbs

Compact Fluorescent Lightbulbs

Compact fluorescent bulbs screw into the same sockets as regular light bulbs. Generally speaking, you can use a compact fluorescent bulb anywhere you now have an incandescent bulb. There are a couple things you need to be concerned about. You can't use fluorescent bulbs with dimmer switches, and fluorescent bulbs are bigger and heavier than incandescent bulbs, which can sometimes be an issue with desk lamps and table lamps.

Color quality, hum, flicker, and bad vibes

Fluorescent lighting has a bad reputation for the quality of light it provides. With good reason. Traditional fluorescent bulbs had relatively poor spectral balance. New compact fluorescent bulbs use a much better mix of phosphors (the white powder coating the inside of the bulb), and have a color quality almost as good as incandescent bulbs. Traditional bulbs also used a core-coil ballast design that could result in hum, flicker, or a 60 Hz frequency reported to cause negative physical or emotional reactions. High-quality fluorescent bulbs now use electronic ballasts, which don't have these problems.

Exercise

Call your local electric company. Ask them if they subsidize compact fluorescent lightbulbs and where you can buy them. Install 5 this week and reduce your carbon dioxide emissions by about ***900 pounds*** this year.

> Men stumble over the truth from time to time, but most pick themselves up and hurry off as if nothing had happened.
>
> — Sir Winston Churchill

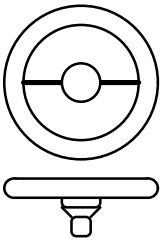
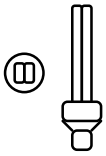
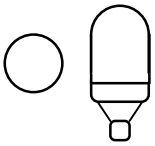
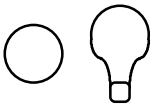
Shapes and sizes

There are dozens of compact fluorescent bulbs on the market, being made by a half-dozen different manufacturers. The bulbs come in all different shapes, sizes and wattages. Three of the common shapes are shown below: the ring, the quad, and the capsule. Floodlights, table lamps, and fixtures are also available. Wattages range from 7 to 30, representing incandescent equivalents from 25 to 135 watts.

Subsidies

In many places the local power company subsidizes compact fluorescent lightbulbs. Here in the San Francisco Bay area you can get $27 bulbs for $10. I hear that in Boston you can get compact fluorescent bulbs for $2.

> [The U.S. government] should replace every light bulb with one of the new long-life bulbs that consume only a fraction as much electricity to produce the same amount of light.
>
> — Vice President Al Gore, *Earth in the Balance*

	Fluorescent			Incandescent
make	**Lights of America #2022**	**Osram Delux EL**	**Panasonic T18W**	**General Electric 75 watt**
brightness	1550 lumens	1200 lumens	1100 lumens	1300 lumens
color quality	86%	82%	82%	91%
power	22 watt	20 watt	18 watt	75 watt
market price	$20	$27	$25	$1
sample subsidized price	$4	$10	$10	$1
life span	12,000 hours	10,000 hours	9,000 hours	1,000 hours
hum	no	no	no	no
flicker	no	no	no	no
instant-on	instant	1 second	2 seconds	instant
				

Bottom Line Replace your ugly old incandescent bulbs with cool new compact fluorescents. It's one easy, cost-effective thing you can do to consume less, pollute less, and build a brighter world.

Family Planning

Slowing Down

Like compact fluorescent lightbulbs, family planning is one of the cheapest, simplest, most effective ways we can build a brighter future. Population problems contribute to many of the world's other problems, such as starvation, pollution, and war. By attacking the population problem, we can help curb other problems that cause human suffering. As Vice President Al Gore succinctly put it, "No goal is more crucial to healing the global environment than stabilizing human population."

Taking the initial steps toward solving the population problem is fairly cheap and easy. To slow the rate of population growth we don't need coercive programs, government restrictions, or sweeping religious conversions. All we need to do is make voluntary family planning programs widely available, which we could do for as little as ten billion dollars per year. But we need to act soon—present family planning services fall far short of reaching the existing demand for them. The U.N. has reportedly calculated that if all women who said they wanted no more children were able to stop childbearing, the number of births would be reduced by 27 percent in Africa, 33 percent in Asia, and 35 percent in Latin America. Universal access to contraceptives and family planning services would have a dramatic impact on population growth. If we could achieve this by the turn of the century, it is estimated that the number of contraceptive users in developing countries would rise from 45 percent today to about 75 percent.

Step One

The first step in solving the population problem is to meet existing demand for family planning. Government programs like the ones in India and China are gradually becoming more wide-spread, less regimented, and better suited to people's wants and needs. Organizations like *Planned Parenthood* and *Pathfinder International* provide advice and leadership to world governments, and bring family planning services to people not served by their governments. Unfortunately, international family planning organizations like *Planned Parenthood* don't have anywhere near the funding needed to reach all the people who need their services. According to *Zero Population Growth*, the United States and other industrialized nations combined spend less money annually to help deliver family planning services to the developing world than U.S. consumers spend each year on Halloween costumes. Step one is to provide adequate levels of funding to international family planning efforts. We don't need to wait for world leaders to do that—you and I can do that directly, simply by sending our money.

Family planning is a controversial subject in some countries. In the '60s and '70s, it was very difficult to discuss, but if you discuss it in health terms, family planning is generally not controversial because it is so important for the health of women and the survival of children.

...the world population crisis which was identified in the '60s really can be essentially overcome if sufficient resources are made available over the next two decades. I think the next two decades are critical: the '90s and the first decade of the next century. And resources are key.

— Steven Sinding, Population Adviser at the World Bank and former Director of the Office of Population at the United States Agency for International Development (USAID)

Step Two

The second step in solving the population problem is to increase awareness of the problem. For example, here in the United States many people mistakenly perceive overpopulation as a third-world problem. In fact, the U.S. already has far more people than it sustainably supports, but the population is still rising, the topsoil is eroding, and the wilderness is being mined, logged, and paved. In a sense, our own reproductive choices are even more important than those of people in developing nations, because the reproductive choices of Americans have a disproportionate impact on the global system—for example, the average American consumes the same amount of energy as 3 Japanese, 6 Mexicans, 13 Chinese, 35 Indians, 153 Bangladeshis, or 499 Ethiopians. Clearly we need to do our share here at home to fight the population problem.

Limiting human numbers will not alone end warfare, environmental deterioration, poverty, racism, religious prejudice, or sexism; it will just buy us the opportunity to do so.

— Paul and Anne Ehrlich, *The Population Explosion*

Exercise

Don't have more than one kid. Encourage others not to have more than one kid.

Bottom Line

We need to fund international family planning efforts, and you and I can take personal responsibility for doing so. You and I can also make responsible reproductive choices ourselves.

Philanthropic Contributions

Background

One of my tasks from 1992 to 1995 was to figure out how to intelligently allocate the $70,000 that I endowed the Gumption Trust with. I've considered many uses for this money, everything from spending it on fund-raising to investing it in basic research. Out of all the possibilities, the one I came to focus on was contributing money to philanthropic organizations that will use it more efficiently than I could. So during those years, in addition to educating myself about the state of the world, I also researched philanthropic organizations, trying to identify ones I wanted to support and that I want to encourage other people to support.

Getting My Feet Wet

Rather than just up and give away tens of thousands of dollars, I wanted to get my feet wet first, by looking at lots of different types of philanthropic organizations, making some small contributions, and getting a feel for what they bought.

In January 1992, I made $100 donations to 23 organizations supporting a wide variety of causes I'm sympathetic to. I asked each organization for a financial report, and kept track of the results. I looked at the size of each organization, the timeliness of their replies, the portion of their budget spent on overhead and fund-raising, the portion spent on membership services, and the portion spent on actual public service programs. The results were interesting. The sizes of the organizations varied more than I expected—all the way from Media Watch, which runs on about $20,000 per year, up to Amnesty International, which runs on $30 million a year—representing more than a thousand-fold difference from smallest to largest. Responsiveness also varied. The most responsive organizations were third party political campaigns, which took only a few days to acknowledge my contribution, and which provided detailed financial information within a week or two. The least responsive organization was the ACLU, which took 31 days to cash my check, 42 days to thank me for it, and never sent me a financial report, despite repeated requests. Surprisingly, two of the organizations refused to send me financial reports without knowing why I wanted them—I immediately dropped them from consideration for further funding. As for the cost of overhead, fund-raising, and membership services, across the 23 organizations these items ranged from 0% to 80% of the total budgets. I looked for some pattern between these factors of size, responsiveness, and budget focus; to my surprise, I found almost no correlation among the three.

Exercise

Send me e-mail about your experiences with philanthropic organizations. Tell me about the most interesting and unusual ones you've found. Recommend one or two I really ought to learn more about.

Decision Criteria

At that point I wanted to select a handful of good organizations for larger contributions. I decided on six characteristics to look for in these organizations:

Root Problems
The first characteristic I looked for was an emphasis on addressing problem roots rather than specific problems. For example, I looked for organizations striving to reduce population growth rather than organizations acting to counteract the effects of population growth by saving endangered species or lobbying against incinerators. See *World Problems* for a discussion of root problem types.

Tangible Results
Secondly, I looked for organizations with an emphasis on producing immediate, tangible results, like saving a person's life or preventing a pregnancy, rather than organizations working to pass laws, raise public awareness, or take other indirect action intended to eventually lead to tangible results.

NCIB approval
The third thing I looked for in candidate organizations was approval from the National Charities Information Bureau (NCIB), a non-profit corporation that evaluates philanthropic organizations and publishes summaries of their findings.

Bottom Line

Making a couple dozen "experimental" donations last year helped me settle on a set of characteristics to look for in philanthropic organizations.

Philanthropic Contributions

Decision Criteria, Cont.

Public Service Focus

Next I looked at the budget breakdowns of the candidate organizations. I steered clear of organizations that spend lots of money on fund-raising, overhead, or donor services. I looked for organizations that focused primarily on public service.

International Focus

The fifth characteristic I sought was an international focus. For example, I'd rather support an international family planning effort than the local chapter of Planned Parenthood. I have three reasons for this preference. The first is simple economics—money goes further in developing countries than it does here in America. For the same amount of money, a family planning clinic in Nigeria can hire more staff and buy more contraceptives than a clinic in California. Secondly, I think that in general any international trade or international aid effort tends to promote cooperation between workers in different countries, increase cultural exchange, and help fight nationalism and tribalism. And lastly, if we all think globally but act locally, then regions that are fairly well off will remain fairly well off, and regions deeply in need of aid will remain in need of aid—so it's important to think globally and act globally.

Cost Effectiveness

The last characteristic I looked for was good, old-fashioned cost effectiveness. I wanted to find the organization which could use the money to achieve the most positive impact on the global system. I want to realize the most prevented suffering per dollar of my philanthropic contributions. In fact, this criteria is really at the heart of the preceding five criteria, and it's the one that's of overriding importance to me. Compared to my desire for cost effectiveness, I have no particular preferences regarding what sort of suffering is prevented: I don't care where or when the suffering is prevented, or what the race, sex, or religion of the beneficiary is.

Midway through the year it became clear to me that international family planning organizations are particularly well matched to the above criteria—they focus on a root problem, they produce tangible results, they have a strong public service focus as well as an international focus, and they are tremendously cost effective as a result of generally focusing on prevention rather than relief work.

Family Planning

Controlling unwanted population growth is the main benefit I see coming from family planning work, but there are many other benefits as well. Family planning helps to insure all children are born into a home where they are wanted and can be cared for. In developing countries especially, family planning work often improves living conditions for women, and helps women to have more freedom and more control of their lives, opening new options and opportunities. Many family planning programs are creatively integrated with synergetic programs that provide women with opportunities for education, employment, and financial assistance. Family planning programs can also help provide a framework for women to network and organize, leading society to more egalitarian relationships between men and women. Family planning helps to prevent the need for abortion, which pro-choice and pro-life advocates both view as tremendously important in a world where women undergo tens of millions of abortions a year, many of them unsafe. Family planning also provides much needed basic health care services in a world where one million women die each year from preventable reproductive health problems, and one hundred million women per year suffer from illness and injury arising from complications during pregnancy and childbirth.

Bottom Line

Ultimately I settled on international family planning as the general area of activity that best matched my criteria for selecting philanthropic causes.

Family Planning Organizations

Benefits Having settled on international family planning as the general area of activity I wanted to support, I then studied up on a number of different family planning organizations and eventually picked a handful to make contributions to. Between January 1992 and December 1995 I donated $64,000 to the seven organizations listed here.

Pathfinder International
9 Galen Street, Suite 217
Watertown, MA 02172-4501
617-924-7200

Founded in 1957, Pathfinder works to increase the number of individuals in developing countries who have access to, and voluntarily use, high quality family planning services. Pathfinder provides funding and technical support to locally administered projects in over 25 countries in Africa, Latin America, and Asia. Pathfinder has a staff of about 175 worldwide, of which two out of three are non-Americans. They operate on about 25 million dollars a year, of which they spends less than 1% on fund-raising (which is why none of us had ever heard of them).

The Population Council
One Dag Hammarskjold Plaza
New York, NY 10017
212-339-0500

The Population Council was founded in 1952 to apply science and technology to the solution of population problems in developing countries. The Council does many types of work: contraceptive development, demographic research, policy analysis, technical assistance to the other organizations, information dissemination, etc. What interests me most is the work being done by the Council's Center for Biomedical Research, which develops new contraceptive technology. The Center for Biomedical Research is responsible for the development of NORPLANT™ and it is currently working on a number of different projects including antifertility vaccines for men and women and subdermal implants for men. The Population Council has a staff of 310 and an annual budget of about 38 million dollars, of which about 30% goes to the Center for Biomedical Research, and about 0.5% is spent on fund-raising.

PPFA-FPIA
Planned Parenthood Federation of America, Family Planning International Assistance
810 Seventh Avenue
New York, NY 10019
212-541-7800

Family Planning International Assistance is the international division of Planned Parenthood Federation of America, which is the national association of local Planned Parenthood affiliate organizations. PPFA created FPIA in 1971 at the request of the U.S. Agency for International Development (USAID), but during the Reagan and Bush administrations their USAID funding was cut off. PPFA-FPIA provides leadership, technical assistance, and support to projects in developing nations to help ensure that individuals have the knowledge and means to make informed, private decisions about childbearing. PPFA-FPIA has a staff of 46 and an annual budget of about 5 million dollars, with which they support 42 projects in 24 countries. I don't have a separate statistic for FPIA, but PPFA and its affiliates spend about 5% of their budget on fund-raising.

IPPF/WHR
International Planned Parenthood Fed.
Western Hemisphere Region
902 Broadway, 10th Floor
New York, NY 10010-6089
212-995-8800

IPPF is the international association of local and national Planned Parenthood affiliate organizations, such as PPFA mentioned above. The Western Hemisphere Region (IPPF/WHR) is one of the six regional organizations that comprise IPPF. IPPF/WHR is a membership organization with 46 affiliates (e.g. PPFA), each of which is a private, autonomous organization. IPPF/WHR provides technical assistance and financial support to these affiliates and to other organizations in the Western Hemisphere that provide family planning education and services. IPPF/WHR affiliates operate 2,000 permanent clinics and 40,000 "service points". They are staffed by 3,000 professionals and 30,000 volunteers, and serve about 8 million clients. The IPPF/WHR office in New York employs 60 people. The budget for the IPPF/WHR regional office in New York is about 15 million dollars a year, of which they spend about 2% on fund-raising.

AVSC
Association for Voluntary Surgical Contraception
79 Madison Avenue
New York, NY 10016
212-561-8000

AVSC was founded in 1943 to help increase the availability of voluntary sterilization in the US. In 1972 AVSC began working internationally, and is now active in over 50 developing countries around the world. AVSC's work focuses on clinical contraceptive methods, including NORPLANT™, IUD's, and voluntary sterilization (which is now the most widely used contraceptive method in the U.S. and the world). AVSC has a staff of 120 and an annual budget of about 15 million dollars, of which it spends about 2.5% on fund-raising, and about 20% on quality assurance and program evaluation, to help ensure both safety and effectiveness and informed client decisions.

IPAS
303 E. Main Street
P.O. Box 100
Carrboro, NC 27510
919-967-7052

IPAS is an international organization concerned with the problem of unsafe abortion. Complications from unsafe abortion account for about 200,000 deaths each year, 99% of which are in the developing world. IPAS has a small factory, and they promote safe respectful abortion care by manufacturing a simple medical instrument for Manual Vacuum Aspiration (MVA), and by introducing doctors and decision makers to the MVA technology and making it more prevalent worldwide. IPAS receives no USAID funding, and has a modest budget of about 2 million dollars a year.

PATH
Program for Appropriate Technology in Health
4 Nickerson Street
Seattle, WA 98109-1699
206-285-3500

Since 1976, PATH has managed more than 500 health and family planning projects in 85 developing countries. PATH has a staff of about 150 and an annual budget of about 17 million dollars.

In Conclusion…

What $10,000 Can Buy

Back in 1992 my friends and I gave about $10,000 to PPFA-FPIA. (See page 39 for a description of PPFA-FPIA.) I'm going to speculate about just what that money helped accomplish, to give you some idea of what $10,000 can buy. I can't hope to offer accurate numbers here, but I'm going to go ahead and make some rough estimates because I think this is important, and because I think uncertain data is better than no data at all. Please keep in mind that these are very rough guesses—I wouldn't be surprised if some of these figures are off by a factor of five:

I believe our $10,000 given to PPFA-FPIA accomplished all of the following:

- purchased a one year supply of contraceptives for maybe 600 couples (e.g. 10,000 condoms, 3,000 cycles of oral contraceptives, and 100 IUDs), and
- covered the costs involved in running the clinics that distribute these contraceptives (e.g. paying staff, renting space, transporting contraceptives, printing literature, etc.), and
- prevented maybe a couple hundred abortions, and
- funded a small number of abortions, and
- probably saved one woman's life, by preventing fatal reproductive health related problems (e.g. a woman killing herself from a self-induced abortion), and
- saved maybe five women from being handicapped by unsafe abortions (e.g. accidentally sterilizing themselves), and
- prevented maybe a couple hundred cases of illness and injury from pregnancy complications, and
- reduced, by one or two thousand, the absolute size of world population in 2050, and
- reduced, by perhaps 30 or 60, the number of children who will die in the remainder of my lifetime for lack of sufficient food or clean water, and
- reduced, by perhaps 100,000 tons, the amount of topsoil that will be lost in my lifetime
- and so on...

In Conclusion...

The decisions I made between 1992 and 1995 will probably help to save several woman's lives, and will almost certainly have a profound positive influence on the lives of hundreds of people. I plan to continue working on this project in the coming years, learning more about my world and helping to make it a happier, safer, more humane place to live. I hope you'll join me on this journey.

Sincerely,
BK Skinner

Dedication

I'd like to dedicate this letter to Robert Emler, my 11th grade English teacher. He made us read about the Holocaust and talk about it afterwards. He asked us questions about our perceptions of the world around us. He helped us to see how very rich we were, criticized us for not realizing it, and implored us not to take it for granted. He challenged us to think critically, to work hard, to care about people we'd never meet—to go out and change the world. In all this he was gentle and patient and tolerant, but unnervingly persistent in his views about the world.

Many people have contributed to making this letter a reality. I want to thank a small handful who have played key roles: L.M. Fenner, M.E. McNabb, P.J. Park, N.J. Parlante, R.R. Rosner, E.D. Skinner, P.J. Smul, A.F. Wright, C.A. Wright, J.D. Zelenski, and the good people of the Big Happy Home.

Appendix

more things to read and to think about

The groundwork for the great social movements of the past was laid through many years of searching, intellectual interchange, social experimentation, collective action, organization, and struggle. The same will be true of the coming stages of social change.

— Noam Chomsky

The pioneers of a warless world are the youth who refuse military service.

— Albert Einstein

My country is the world and my religion is to do good.

— Thomas Paine

Resources

No New Kneading

When I set out to write about my concern for the state of the world I promised myself that I wouldn't repeat work which someone else had already done. I decided that if I read something I liked I should just refer my readers to that rather than write about the subject myself.

Selection

The works listed below are my personal selections. They represent what I believe to be the best available literature, laboriously selected from the oceans of published material. For every item that made it onto the list below there are many others on my shelf that did not.

Books

The Population Explosion
by Paul and Anne Ehrlich
Simon and Schuster, 1990

State of the World 1995
by Lester R. Brown and a cast of 11
Worldwatch Institute, 1995

Earth in the Balance
by Vice President Al Gore
Houghton Mifflin, 1992

Beyond the Limits
by Donella Meadows, Dennis Meadows, and Jorgen Randers
Chelsea Green Publishing Company, 1992

How Much Is Enough?
by Alan Thein Durning
W.W. Norton & Company, 1992

Filters Against Folly
by Garrett Hardin
Penguin Books, 1985

Getting to Yes: Negotiating Agreement Without Giving In
by Roger Fisher and William Ury
Penguin Books, 1981

Engines of Creation: the Coming Revolution in Nanotechnology
by K. Eric Drexler
Anchor Press, Doubleday, 1986

Literary Machines
by Ted Nelson
Mindful Press, 1980-1990

The Foundation Trilogy
by Isaac Asimov
Avon Books, 1951, 1952, 1953

Software

Balance of the Planet
by Chris Crawford
Chris Crawford Games, 1990

Wall Chart

The Human Suffering Index
by Population Action International
Copyright 1992

Video

World Population Video, VHS
by Zero Population Growth, Inc. and
Southern Illinois University, Carbondale
Copyright 1990

The Population Explosion

by Paul and Anne Ehrlich
Simon and Schuster, 1990
ISBN: 0-671-68984-3
ISBN: 0-671-73294-3
320 Pages

Available from Zero Population Growth
1400 Sixteenth Street NW
Suite 320
Washington, DC 20036
202-332-2200

The Population Explosion is an unusually well-written, readable book about population growth and its effect on the world.

Back in 1968 Paul and Anne wrote the best-seller *The Population Bomb*. They warned of impending disaster if the population explosion was not brought under control. There were 3.5 billion people in 1968. We're now at 5.7 billion, and climbing fast. And since 1968 at least 200 million people—mostly children—have died of starvation. Oh well.

Blurb from the back cover:

> Paul R. Ehrlich is Professor of Population Studies at Stanford University and a 1990 MacArthur Fellow. He has published widely in the fields of ecology, human ecology, evolution, and behavior. Anne H. Ehrlich is a Senior Research Associate in Biological Sciences at Stanford University. She writes about population, resources, and environment.

Vice President Al Gore, commenting on *The Population Explosion*:

> Paul and Anne Ehrlich point out that humankind has entered a brand new relationship with Planet Earth. For the first time, our numbers threaten the ecological systems that support life as we know it... The time for action is due, and past due. The Ehrlichs have written the prescription. ...If every candidate for public office were to read and understand this book, we would all live in a more peaceful, sane and secure world.

Selected quotes:

> Each hour there are 11,000 more mouths to feed; each year, more than 95 million. Yet the world has hundreds of billions *fewer* tons of topsoil and hundreds of trillions *fewer* gallons of groundwater with which to grow food crops than it had in 1968.
>
> One of the toughest things for a population biologist to reconcile is the contrast between his or her recognition that civilization is in imminent serious jeopardy and the modest level of concern that population issues generate among the public and even among elected officials.

State of the World 1994

by Lester R. Brown and a cast of 11

W.W. Norton & Company, 1995
ISBN: 0-393-31261-5

Available from the Worldwatch Institute
1776 Massachusetts Ave., NW
Washington, DC 20036
202-452-1999

Every year the Worldwatch Institute publishes a new version of *State of the World*. The series has become a cornerstone for people working to address world problems. For several years Ted Turner of Turner Broadcasting has been distributing copies to members of the U.S. Congress and to chief executive officers of Fortune 500 corporations. I buy copies to give to friends and family.

Blurb from the *1994* back cover:

> *State of the World* has been translated into 27 languages, including Arabic, Chinese, French, German, Japanese, Portuguese, Russian, and Spanish. National governments, United Nations agencies, the international development community, policy and lawmakers rely on *State of the World* for the most current, authoritative, reasoned environmental information available.

New York Review of Books:

> *State of the World* deals with calamitous events rationally and constructively, and always offers logical solutions.

Blurb from the *1992* back cover:

> *State of the World 1992* contends that we already know what we need to do, and that we already have the technologies needed for the Environmental Revolution to succeed. Whether we achieve the Environmental Revolution is therefore primarily a question of individual and corporate commitment, social change, and political will.

Earth in the Balance

by Vice President Al Gore
Houghton Mifflin, 1992
(hardback) ISBN: 0-395-57821-3
(paperback) ISBN: 0-452-26935-0
407 Pages

When I bought this book a year ago on a friend's recommendation I had never heard of Al Gore. The book turned out to be excellent, and I immediately added it to my recommended reading list. Since then Gore has become Vice President, and my friends have suggested that the inclusion of his book here may have unintended political overtones. Well, what can I say? It's a good book, so I'm leaving it on the list.

Gore's book covers most of the same basic material as *State of the World*, but with more anecdotes and a more approachable writing style. *Earth in the Balance* has some of the best material of any of the books I read this year and I highly recommend it. Unfortunately, the book is also really long. I read slowly, and for me Gore's book was a challenge just because of its size, whereas *State of the World* was a challenge because of its density. Despite its length, Gore's book is worth reading in its entirety because it's scattered with lots of little gems—an inspirational passage about the siege of Leningrad, a good story about how the ozone hole was and was not discovered, a surprising look at what it takes to change how GNP is calculated, etc.

Carl Sagan, commenting on *Earth in the Balance*:

> A global environmental crisis threatens to overwhelm our children's generation. Mitigating the crisis will require a planetary perspective, long-term thinking, political courage and savvy, eloquence and leadership—all of which are in evidence in Al Gore's landmark book.

Selected quote:

> The problem is not so much one of policy failures: much more worrisome are the failures of candor, evasions of responsibility, and timidity of vision that characterize too many of us in government. More than anything else, my study of the environment has led me to realize the extent to which our current public discourse is focused on the shortest of short-term values and encourages the American people to join us politicians in avoiding the most important issues and postponing the really difficult choices.

Beyond the Limits

by Donella Meadows,
Dennis Meadows,
and Jorgen Randers
Chelsea Green Publishing Co., 1992
(hardback) ISBN: 0-93003105505
300 Pages

Available from Productivity Press
P.O. Box 3007
Cambridge, MA 02140
1-800-274-9911

I introduced *Beyond the Limits* when talking about Systems Analysis and World Models. The authors of *Beyond the Limits* spend about half the book introducing some concepts from systems analysis and discussing world problems from a systems perspective. The second half of the book discusses *World3*, a mathematical model of the world that the authors use to investigate the behavior of the world as a system, catalog possible scenarios for the future, and identify actions we can take today to guide us toward happier, less tragic futures. The *World3* model is publicly available and runs on home computers, for those whose curiosity is aroused by the book.

Blurb from the jacket:

> *Beyond the Limits* ... is the path-breaking sequel to *The Limits to Growth*, the international best-seller which sold 9 million copies in 29 languages when it was published 20 years ago. At that time the authors concluded that if the present trends of growth continued unchanged, the limits to physical growth on the planet would be reached in the next 100 years. Now, in *Beyond the Limits*, the authors show that the world has already overshot some of its limits, and if present trends remain unchanged, we face the virtually certain prospect of a global economic collapse in the next century.

Kirkus Reviews:

> An impressive sequel to the controversial and influential *The Limits to Growth*... An invaluable update that leaves no doubt that the time to effect meaningful change has grown extremely short, but nevertheless shuns gloom and doom to be boldly pragmatic about the future.

How Much Is Enough?

by Alan Thein Durning
copyright 1992 by Worldwatch Institute
W.W. Norton & Company, 1992
(hardback) ISBN: 0-393-03383-X
(paperback) ISBN: 0-393-30891-X
200 Pages

Available from the Worldwatch Institute
1776 Massachusetts Ave., NW
Washington, DC 20036
202-452-1999

How Much Is Enough? is a concise, easily-read discussion of modern consumption, offering a high-level perspective on consumption patterns, trends, and effects. Durning's book presents the world as being divided into three general classes of people. At one extreme are the 1.1 billion poor who are consuming too little, who lack sufficient grain and safe water, and who may behave in desperate, ecologically destructive ways. In the middle are the 3.3 billion people of the middle class who are consuming a reasonable amount, who enjoy clean water, sufficient food, and the use of bicycles, buses, and other simple, efficient possessions. At the far extreme are the 1.1 billion consumers who are consuming too much, who eat meat and frozen foods, drink soft drinks, drive private cars, and who are placing a terrific burden on the earth's ability to provide resources and absorb waste products. In the book Alan Durning advocates some common-sense changes in life-style for those of us in the consumer class, and rebuffs the consume-or-decline mentality now common even among well-educated people in America.

Selected quote:

> Only population growth rivals high consumption as a cause of ecological decline, and at least population growth is now viewed as a problem by many governments and citizens of the world. Consumption, in contrast, is almost universally seen as good—indeed, increasingly it is the primary goal of national economic policy.

Filters Against Folly

by Garrett Hardin
Penguin Books, 1985
(paperback) ISBN: 0 14 00.7729 4
240 Pages

Available from Penguin USA/Cash Sales
120 Woodbine Street
Bergenfield, NJ 07621
1-800-526-0275

Available from Whole Earth Access
2990 Seventh Street
Berkeley, CA 94710
1-800-845-2000

Lynton K. Caldwell, commenting on *Filters Against Folly*:

> *Filters Against Folly* offers an antidote to some of the more perverse and dangerous irrationalities of our time: wishful self-delusion, educated incapacity, and foolhardy optimism.

From a review in the *Whole Earth Ecolog*, an excellent book itself:

> Twenty years ago, Garrett Hardin published a deadly essay titled "The Tragedy of the Commons." In it, he showed ... that individual citizens attempting to better their lot by adding one more sheep to the commonly owned pasture would inevitably bring ruin to all. This concept opposed the view held by many economists that the sum of individual strivings for advancement will benefit society as a whole. Hardin has aroused further controversy by advising that the U.S. not send aid to countries with rapidly expanding populations, claiming that such aid only brings worse problems later. "We Are The World" fund-raising isn't necessarily a good idea.
>
> The book further elucidates the idea of "commons"—it's easy to conceive of many that have little to do with sheep. More important, Hardin offers us a lesson in critical thinking so that we may be better able to avert lurking ecological catastrophe. He suggests that we subject incoming information from all sources—friend and foe—to three filters: Literacy—what's really being said; Numeracy—insisting upon quantification and careful interpretation of numbers; and Ecolacy—examining the long-run complex effects of our actions.

Getting to Yes: Negotiating Agreement Without Giving In

by Roger Fisher and William Ury
ISBN: 0-14-006534-2

Available from Penguin USA/Cash Sales
120 Woodbine Street
Bergenfield, NJ 07621
1-800-526-0275

Available from Whole Earth Access
2990 Seventh Street
Berkeley, CA 94710
1-800-845-2000

Selected quote:

> This book began as a question: What is the best way for people to deal with their differences? For example, what is the best advice one could give a husband and wife getting divorced who want to know how to reach a fair and mutually satisfactory agreement without ending up in a bitter fight? Perhaps more difficult, what advice would you give one of them who wanted to do the same thing? Every day, families, neighbors, couples, employees, bosses, businesses, consumers, salesmen, lawyers, and nations face this same dilemma of how to get to yes without going to war.

From a review in the *Whole Earth Ecolog*, an excellent book itself:

> The point is to negotiate on principle, not pressure—on mutual search for mutually discernible objectivity, patiently and firmly putting aside every other gambit. The book is a landmark, already a bible for international negotiators but just as useful for deciding which movie to see tonight or which school to send the family scion to.

Engines of Creation: the Coming Revolution in Nanotechnology

by K. Eric Drexler
Anchor Press, Doubleday, 1986
(paperback) ISBN: 0-385-19972-2

Unbounding the Future: the Nanotechnology Revolution

by K. Eric Drexler and Chris Peterson with Gayle Pergamit
William Morrow & Company, 1991
(hardback) ISBN: 0-688-09124-5

Nanosystems: Molecular Machinery, Manufacturing, and Computation

by K. Eric Drexler
John Wiley & Sons, 1992
(paperback) ISBN: 0-471-57518-6

Available from The Foresight Institute
Box 61058
Palo Alto, CA 94306
415-324-2490

In 1989 I happened upon this unusual book, *Engines of Creation*, by K. Eric Drexler. In his book Dr. Drexler made some predictions about the future. He made some of the most original, extraordinary, reasonable predictions that I had ever read, all based on a new technology that he dubbed *molecular nanotechnology*. Molecular nanotechnology is the technology of building things with atomic precision by assembling them atom by atom. For example, in 1990 researchers at IBM used a scanning tunneling microscope to position 35 xenon atoms on a flat surface to make the letters "IBM". The entire logo was about a nanometer long—a millionth of a millimeter, and a thousandth of the width of the smallest wires in a computer chip. This stunt made the news, and you might have seen a picture of the little logo in your newspaper. Making tiny logos has little practical value, but someday we will be able to make little machines using similar techniques, and proponents of nanotechnology assert that it will give us thorough, inexpensive control over the structure of matter. This may lead to a nanotechnology revolution that will be similar in significance to the industrial revolution.

When I read *Engines of Creation* four years ago I wasn't sure whether Drexler was crazy or brilliant, but I finished the book and didn't think much more about it for two years. Then two years ago I decided to take a closer look at Drexler's ideas. By then IBM had made their xenon logo, other researchers had made other advances, and the scientific community was taking nanotechnology seriously. *Scientific American* has said, "Nanotechnology ... has the curious ring of inevitability," and *Nature* has said, "Nanotechnology ... seems destined to becomes Japan's next priority target for industrial research." During the past two years I've spent a fair amount of time looking into molecular nanotechnology, reading books and attending lectures and discussions to hear first hand what Eric Drexler and his peers had to say. I don't have enough background in chemistry to speak as an expert, but in my opinion Drexler's ideas are basically sound, and I believe that many of his predictions will eventually come to pass.

Marvin Minsky, commenting on *Engines of Creation*:

> *Engines of Creation* is an enormously original book about the consequences of new technologies. It is ambitious and imaginative and, best of all, the thinking is technically sound.

Selected quote from *Engines of Creation*:

> The basic properties of atoms and molecules are already well understood. The existence of molecular machines in nature shows that machines at that scale are physically possible. No new fundamental *science* is needed; nanotechnology will be an engineering advance. This makes it foreseeable, unlike future scientific discoveries.

Literary Machines

by Ted Nelson
Mindful Press, 1980-1990

Available from Mindful Press
3020 Bridgeway, Suite 295
Sausalito, CA 94965

Literary Machines is a book about what computers ought to do, and about what the Xanadu software project may someday make them do. *Literary Machines* is also about building tools to solve information problems, and about organizing human knowledge and making it accessible.

Selected quotes:

> There is every reason to suppose that even if humanity survives the next century, it will be in ever-more horrific circumstances, a dungheap, more and more filled with spreading slums—the *favelas* of Brazil, the *barrios* of Mexico, the South Bronx of New York; the natural world in retreat, the jungles turning to desert and today's deserts growing, the waters poisoned and growing areas of land turned unsafe by chemicals.
>
> None of this can be stopped. But there is some hope in the realm of human mental affairs, upon which the survival of humanity, and the better parts of human culture, depend. Facilities to aid the mind, and share its products ... must become unified and available to all, quickly. ...
>
> Electronic networking and publishing already come in many flavors, but in a chaotic and Balkanized fashion. A universal repository hypertext network will change that: it will make stored text and graphics, called on demand from anywhere, an elemental commodity, like water, telephone service, radio and television. ... As a new layer able to create compatibilities between existing systems it will tear down the walls. It can recombine what should never have been separate: "word processing," "outline processing," teleconferencing, "electronic mail," electronic publishing, archiving. ... The Xanadu concept is unified and sweeping; both a unified vision of interconnected data published to the computer screen, and also a new way of handling that data, a way to clean up today's mess of disconnected files in which we all wallow, even privately in our offices and homes now.

The Foundation Trilogy

by Isaac Asimov

Avon, Ballantine, and Bantam Books
(paperback) ISBN: 0-553-29335-4
(paperback) ISBN: 0-553-29337-0
(paperback) ISBN: 0-553-29336-2

Available from Bantam Books
666 Fifth Avenue
New York, NY 10103

The Foundation Trilogy is classic bit of 40-year old science fiction in which Asimov presents a brilliant introduction to the idea of applying quantitative methods to sociology.

From the Prologue to the second book:

> The Galactic Empire was Falling.
>
> It was a colossal Empire, stretching across millions of worlds from arm-end to arm-end of the mighty double-spiral that was the Milky Way. Its fall was colossal, too—and a long one, for it had a long way to go.
>
> It had been falling for centuries before one man became really aware of that fall. That man was Hari Seldon, the man who represented the one spark of creative effort left among the gathering decay. He developed and brought to its highest pitch the science of psycho-history.
>
> Psycho-history dealt not with man, but with man-masses. It was the science of mobs; mobs in their billions. It could forecast reactions to stimuli with something of the accuracy that a lesser science could bring to the forecast of a rebound of a billiard ball. The reaction of one man could be forecast by no known mathematics; the reaction of a billion is something else again.
>
> Hari Seldon plotted the social and economic trends of the time, sighted along the curves and foresaw the continuing and accelerating fall of civilization and the gap of thirty thousand years that must elapse before a struggling new Empire could emerge from the ruins.
>
> It was too late to stop that fall, but not too late to close the gap of barbarism. Seldon established two Foundations at "opposite ends of the Galaxy" and their location was so designed that in one short millennium events would knit and mesh so as to force out of them a stronger, more permanent, more quickly appearing Second Empire.

Balance of the Planet

Computer Game
by Chris Crawford
Chris Crawford Games, 1990

Available for Mac and PC
Chris Crawford Games
P.O. Box 360872
Milpitas, CA 95036-0872
408-946-4626

Balance of the Planet is a computer game that runs on Macs and PCs and is available for $30 or $40. *Balance of the Planet* is sold as a game, but I use it more as a reference book and an educational aid. The program is based on a simple mathematical model of the world, with quantitative relationships between a hundred-odd different factors, for example, the amount of coal burned and the amount of acid rain that results. The manual that comes with the game offers an unusually concise, approachable overview of the world, listing each of these factors on its own page with a short, well-written overview. The mathematical model behind the game is readily accessible to the interested user, but the casual user need never see a single equation.

From the box:

> Finally recognizing the gravity of the environmental crisis, the United Nations has appointed you its High Commissioner of the Environment. You have the powers to levy taxes on industry and grant subsidies to a variety of worthwhile activities.
>
> You must use this power wisely, for you are responsible for all aspects of the environmental crisis. You are graded on your ability to balance the world's economic well-being with the vitality of the earth's ecology. If your policies cripple industrial productivity, you will lose just as surely as if the world is destroyed by toxic pollution.
>
> *Balance of the Planet* incorporates a vast amount of information about the many problems that make up the global environmental crisis. From acid rain to water pollution, from nuclear accidents to global warming, from consumer goods to starvation...

The Human Suffering Index

by Population Action International
ISSN: 0199-9761 1991

Available from
Population Action International
1120 19th Street, N.W.
Suite 550
Washington, D.C. 20036
202-659-1833

Population Action International is a non-profit organization which, among other things, publishes big 22" by 34" double-sided wall-charts that report detailed comparative summaries on topics like access to affordable contraception. *The International Human Suffering Index* is one of these wall-charts, and I think a particularly interesting one, offering a concise, quantitative overview of living conditions worldwide.

Selected quotes:

> *The International Human Suffering Index* statistically rates living conditions in 141 countries. It was created to measure ... differences in living conditions between countries. The presentation also allows a side-by-side comparison of rates of population increase and human suffering.
>
> Each individual country index is compiled by adding 10 measures of human welfare related to economics, health and nutrition, education, communications and governance.
>
> *The International Human Suffering Index* dramatically illustrates the widespread suffering among the world's more than one billion people who live in desperate poverty—a human tragedy greatly aggravated by rapid population growth. Slower rates of population growth would do much to relieve this suffering.

World Population Video, VHS

by Zero Population Growth, Inc. and
Southern Illinois University, Carbondale
Copyright 1990

Available from Zero Population Growth
1400 Sixteenth Street NW
Suite 320
Washington, DC 20036
202-332-2200

The *World Population* videotape is 7 minute capsule summary of human population growth for the past two millennia. The video starts in the year 1 A.D. with a map of the world speckled with little yellow dots, each dot representing a million people. As the video progresses through its 7 minutes a digital clock in the corner marks the passage of the years. With the passage of the years more and more dots appear, and by 1990 the map is colored with over 5,000 dots. By 1990 the dots are appearing at an alarming rate, and it becomes impossible to really keep track of the action. But the video continues, projecting future growth to the year 2020 and giving the viewer a more intuitive feel for the magnitude of current population projections.

Final Accounting

This page is a little postscript to the Gumption Memo, to let you know how the story ends.

Overview

Back in early 1992 I inherited the estate of my aunt, established the Gumption Trust, and sent out the first Gumption Trust donations. In December 1995 I made the final round of Gumption Trust donations and gave away the last of the Gumption Trust money. This page offers a quick overview explaining where the Gumption Trust's money came from, where it went, and what it helped accomplish.

Money

Where it came from

$49,350	my aunt Lois Arden King's estate
$9,400	from Robert Lee Skinner's estate, via Elizabeth Skinner
$24,300	income from Gumption Trust investments
$83,050	total funds

Where it went

$64,000	donations to seven international family planning orgs (for more info, see the page Family Planning Organizations)
$4,000	donations to two local Planned Parenthood clinics
$6,200	misc. donations to about 30 other causes
$1,100	books and compact fluorescent lightbulbs given away
$6,100	Gumption Memo expenses (e.g. printing & postage)
$1,650	"research" overhead (e.g. phone calls, books, travel)
$83,050	total expenditures

Results

Between 1992 and 1995 the Gumption Trust money was spent by a bunch of different organizations on a bunch of different tasks, and it's difficult to say just what was done with it, but here's a partial list of all the things I estimate were accomplished:

- purchased a one year supply of contraceptives for about 3,000 couples (e.g. 50,000 condoms, 15,000 cycles of oral contraceptives, and 500 IUDs), and
- covered the costs involved in running the clinics that distribute these contraceptives (e.g. paying staff, renting space, transporting contraceptives, printing literature, etc.), and
- prevented the need for perhaps 1,000 abortions, and
- contributed to saving the lives of maybe 5 women, by preventing fatal reproductive health related problems (e.g. unsafe abortions), and
- contributed to saving maybe 25 women from being handicapped by unsafe abortions (e.g. accidental sterilization), and
- prevented maybe 1,000 cases of illness and injury from pregnancy complications, and
- reduced, by 5,000 or 10,000, the absolute size of the world population in 2050, and
- reduced, by perhaps 200 or 300, the number of children who will die in the remainder of my lifetime for lack of sufficient food or clean water, and
- reduced, by perhaps 500,000 tons, the amount of topsoil that will be lost in my lifetime,
- and on and on and on...

Most people want the thinking work done for them—I hope you have judged correctly and I am simply underestimating your audience.

— Lorry M. Fenner, historian

I found this material both interesting and informative...

— Al Gore, Vice President

Your *Gumption Memo* was a cool breeze in my doldrum world and the dedication quite undeserved and, like most dedications, untrue.

— Robert Emler, retired English teacher

I stared across the arroyo at the runoff which was cascading down the opposite bank. The entire bank was washing away but the areas held together by grass were eroding more slowly than the unprotected bare areas. This slower erosion turned the clumps of grass into high points which diverged the runoff around them. Many clumps eventually washed down the slope and disappeared in the brown flood below. Yet for as long as each clump of grass remained, it created a divergence which reduced the energy of the cascade. Even if the grass was washed away, it had reduced erosion during the time it stood. If those plants had not been growing on the side of the arroyo, the erosion would have been worse.

I am like the grass, I thought. My efforts prevent the erosion from being worse. Even if the flood washes my efforts away, my resistance will have absorbed some of the flood's energy and lessened the erosion that would have otherwise happened. Whether my efforts are enough to "win" depends upon the force I oppose. If the force is small enough, I shall "win." If it is large enough, I "lose." To be proud of "winning" is to be proud of encountering a force smaller than myself. I should forget about "winning" and, like the grass, simply resist the erosion.

— Paul Krapfel, *Shifting*