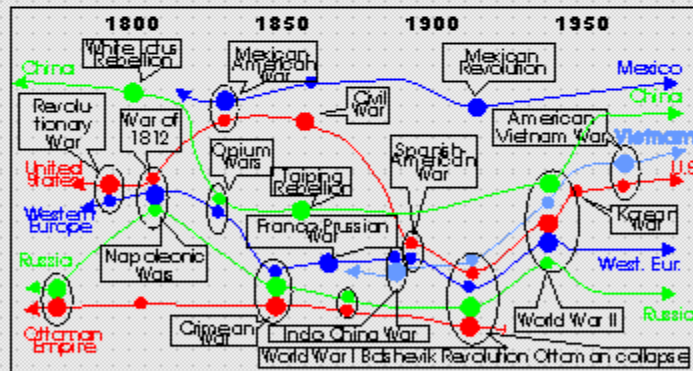


Generational Dynamics for Historians



by John J. Xenakis

author of *Generational Dynamics*
... Forecasting America's Destiny

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Preface

To begin, I am among those who believe that the world is headed for a major “clash of civilizations” world war that will be worse than World War II. The probability of this occurring in the next few years is close to 100%, and if you count the wars in Afghanistan and Iraq, then it already began on 9/11. This conclusion comes from analyzing patterns of generational changes and “world wars” throughout millennia of history, and extrapolating those patterns forward.

We're at a unique juncture in history, 60 years after the end of World War II. Ten years ago, most of America's business and government leaders were from the risk-averse generation that grew up amid the starvation, homelessness, death and destruction of World War II, and these leaders always sought compromise and containment of problems.

Today's business and government leaders are from the risk-seeking Baby Boomer generation of people born after the war. They knew nothing of the horrors of the Depression and WW II, and they learned to be arrogant and demanding during the 1960s, when they humiliated their war hero parents' generation, and forced the downfall of two Presidents (Johnson and Nixon).

The same thing is happening in every country that fought during World War II, which is why we're seeing increasing confrontations around the world in the Mideast, Korea, China, the Caucasus (southern Russia), and other regions. History tells us that this pattern always leads to a major new world war. Testxdef

I believe that it's especially important for young people to understand this conclusion and the reasoning behind it. After all, you are the ones who will be most affected.

There are many books that attempt to predict the future based on historical cycles in finance, war or politics. Every book we've seen, including the most modern and scholarly, makes substantial methodological errors that we've identified. The two biggest and most common mistakes are

1. failure to distinguish between chaotic (in the sense of Chaos Theory) events and ordered (cyclic or growth) trends; and
2. failure to distinguish between generational and non-generational trends.

For example, many cyclic trends were identified in the 1920s, in the aftermath of the Great War (World War I). The best known of these are the 40-50 year cycles identified by Russian researcher Nikolai Kondratiev. It was a great theory until its predictions were contradicted by World War II. The theory of Kondratiev Cycles (K-cycles) is actually valid, but only if you understand that WW I was a generational war in Eastern Europe, and WW II was a generational war in Western Europe.

Probably the most useful accomplishment of Generational Dynamics is to identify and sort out the different components and data series that go into establishing historical cycles and trends and technology growth cycles and trends, and then applying them to the current times. We believe that this work, which unifies numerous analytical and forecasting methodologies, almost completely solves the heretofore unresolved questions about finding patterns in history.

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Some mathematics is used in this book, but the concepts are fully explained for the non-mathematician. But from a mathematical point of view, we construct a complex abstract model of the world through time (using a “magic ball of yarn” as a semi-physical representation of the abstract model), and show how different views of the model produce different results. Chaos Theory defines fractals as graphical representations of the attractor space of a chaotic complex system, and the graphical model of a fractal looks the same from every view. But the complex system model of the earth through time defined in this book exhibits chaos in one view, cyclic generational patterns in another view, and non-generational cycles (like K-cycles) in other views. The result is that the abstract model explains everything, and so is a kind of “unified field theory” for patterns of history.

Theory outline

In outline form, the theoretical development of Generational Dynamics includes the following topics, including page numbers where more information about each topic can be found:

- There are two distinctly different kinds of wars: crisis and non-crisis wars (p. 31). Crisis wars are worst wars, the most genocidal wars. These are the wars that change history, and are remembered for centuries. These wars are emotional, not political (even though a political cause is always given).

America has been in two crisis wars since its founding: The Civil War, in which Northern General Sherman marched through the South, and conducted the world's first “scorched earth” war campaign, burning all buildings and crops to the ground; and World War II, in which we fire-bombed Dresden and Tokyo, killing millions of civilians, and dropped nuclear weapons on two other Japanese cities. (I'm not blaming America for this, only stating that it occurred.)

Non-crisis wars are political wars, always mired in political dissension at home. America has fought in many such wars: The Gulf War, the Vietnam War, the Korean War, World War I, the Spanish-American War, the

Mexican-American war, and the War of 1812 are examples. The issues in these wars are almost completely forgotten today; the wars themselves are almost completely forgotten, except for their names.

- Crisis and non-crisis wars can be clearly distinguished based on historical information about them that can be found in any history book of the appropriate period. My last book was criticized because the method for distinguishing crisis from non-crisis wars was not clear enough, so in this book (p. 189) I've supplemented the intuitive material with an obsessively detailed computer software-like algorithm which can be applied to any war to determine whether it's a crisis or non-crisis war. I believe that this will convince even the most skeptical historian that the distinction between crisis and non-crisis wars is valid.

Caution: The crisis war criteria are precisely defined but not always intuitive. Occasionally someone writes to me and says that he "feels" that such-and-such a war is or is not a crisis war. I hear this most often about Russia in World War II. The crisis war criteria are not based on "feelings." Before jumping to conclusions, make sure that you've applied the criteria precisely as described.

- Both kinds of wars occur in every society and nation, but crisis wars occur almost always at 70-90 year intervals (p. 33). However, there's a lot of variation, and in an examination of over 100 wars throughout history (p. 228), it was found that it's rarely less than 50 years from the end of one crisis war to the beginning of the next and is *never* less than 42 years, although the interval can be over 100 years (p. 32).
- Over time, the population consistently grows faster than the food supply, driving up the price of food, and creating more poverty. (This is what I call the Malthus Effect, p. 62.) Thus, the main evolutionary purpose of genocidal crisis wars is to reduce the population so that there's enough food (and other resources) for everyone. (If you're given to bouts of depression, you may wish to skip reading this book, since one of the principles is that life is a zero-sum game: if one person lives, then someone else has to die, because there isn't enough food for everyone.)
- Major financial crashes are also generational, occurring every 70 years or so (Tulipomania bubble (1637), South Sea Bubble (1721), French Monarchy bankruptcy (1789), Hamburg Crisis of 1857, and 1929 Wall Street crash). A new financial crash is forecast for the next few years (p. 123).
- Every nation and society goes through a recurring pattern of generational eras between crisis wars (p. 35). These eras repeat, in the same order, in every nation and society. This is based on work on generations developed by Bill Strauss and Neil Howe (p. 33). A detailed discussion of the changes between Strauss & Howe's theories and Generational Dynamics will be found starting on p. 235.

- The pattern of cyclic generational changes is extremely robust (p. 37), and corrects itself very quickly (within two generations) after a perturbation. This is true for any nation or society, at any time in history. This fact is important for establishing the validity of the Chaos Theory model.
- When applying Chaos Theory and Complex Systems Theory to Generational Dynamics (p. 69), the robustness of the cyclic pattern can be used to prove that the generational cycles form a cyclical attractor, and create a basin of attraction (p. 98) within the chaos of day to day politics. This establishes a pattern that lets us represent the entire history of the earth through time within a single complex model (p. 90).
- Extending the above model to systems used by researchers of Kondratiev cycles, stock cycles, long waves, and other analytical theories (p. 131), shows how Generational Dynamics resolves the issues of patterns in history, as summarized at the beginning of this preface.
- You *can* predict the future in certain areas, provided that you follow the rules dictated by the findings on chaotic versus ordered portions of the world model.

With regard to the last point, it isn't good enough just to make predictions that turn out to be correct. After all, it's very, very easy to get a million predictions right: Just make two million predictions. To claim to be a good forecaster, you also have to get many predictions right and few or no predictions wrong. We've tried to accomplish that on www.GenerationalDynamics.com .

Cross-disciplinary studies

Readers may be surprised to find terms like “attractor” and “fractals” in this book because they seem unrelated to the study of history. Actually, those are terms from Chaos Theory. My background is in Mathematical Logic, and I've combined Generational Dynamics with Chaos Theory and created an abstract mathematic model for “the way the world works” through history. The millions of political events that occur every day are all random, but the generational cycles form a “cyclic attractor” within the chaotic system, and the model is a fractal when viewed in the right way. This makes history a cross-disciplinary subject in history and math. This is valuable for the study of history because it establishes historical patterns for the first time, and it's important for the study of mathematics because it's a large, complex “real-life” social model of complex chaotic systems. A mathematician with an interest in history could write his Ph.D. dissertation on Generational Dynamics because there's so much work left to be done.

Chapters 5 and 6 incorporate macroeconomic theory into the abstract model, and show how the same long-term and short-term forecasting tools can be used to make certain kinds of financial predictions.

In chapter 7, The Singularity, I came up with a very interesting proof that, under certain reasonable assumptions, the evolution of any intelligent species must follow the Generational Dynamics model. Darwin developed a theory for the evolution of individuals, but Darwin's work provides little guidance for the evolution of groups, and there's nothing, as far as I know, on the evolution of intelligent groups. Much to my own astonishment, Generational Dynamics fills that gap, so that now it's a multi-disciplinary subject involving history, mathematics, macroeconomics and evolution.

I find this to be a fascinating development because it tells us that if there's intelligent life elsewhere in the universe, then they must have evolved pretty much the way we did, and they must have reached the Singularity in pretty much the same way we're going to. It's mind-boggling.

Prerequisites to understanding Generational Dynamics

Obviously an understanding of history is the major prerequisite to understanding Generational Dynamics, and the more history the better. However, let's look at some other prerequisites before discussing history.

Most of the mathematics needed for this book is explained in the book.

My own background is in mathematics, and especially Mathematical Logic, part of which is the theory of defining abstract models, and then proving that the models are logically consistent and the models represent "Truth." In its theoretical development, Generational Dynamics is indeed a model of the real world, and much of this book is devoted, through historical analysis, to showing that the model does indeed represent Truth in the real world. This is done by showing that crisis wars occur in all places and times in history, and that the flow of generational eras between crisis wars is extremely robust.

Chapter xxx (p. 69) contains an introduction to Chaos Theory, and how it applies to Generational Dynamics. We develop a model of the earth through time as a complex system, and show which parts of those model are ordered and which are chaotic. Once that question is answered we can show, for example, that K-cycles and other methodologies for finding patterns in history work sometimes (when trying to find patterns in ordered portions of the model) and fail sometimes (when trying to find patterns in chaotic portions).

Part of the demonstration that the Generational Dynamics model represents Truth in the real world is my web site, www.GenerationalDynamics.com. Since 2002, I've been regularly posting specific, hard predictions about worldwide events, politics, culture, technology, economics and international finance, with nearly perfect accuracy. The reason for this success is that predictions stick to the ordered patterns only. Discussions of chaotic events, such as day to day political changes, are discussed only prob-

abilistically. A lengthy example of such predictions will be found starting on page 104.

There is one more dependency on mathematics: the frequent use of exponential growth curves to analyze growth of population, food, stock prices, technology growth, and so forth. This is a subject that I discussed at length in my previous book, and I won't repeat it here, but some familiarity with exponential growth and technological forecasting is very helpful in learning Generational Dynamics.

I became familiar with exponential growth of technology trends in the 1970s, and I've long wondered if there was an equivalently rigorous explanation of cyclic trends or the "pendulum effect" in politics. Thus, when I became aware of the generational paradigm shortly after 9/11, I immediately became pretty much driven and obsessed with it, resulting in my last book and this one.

Now let's return to the history prerequisites.

History prerequisites

Although many people have been supportive of me in this project, many others have been dismissive, usually making some remark about leaving history to the historians.

Indeed, many, many people become extremely emotional about this. I've been startled more than once by having people, even esteemed historians and other people who really should know better, become extremely irrational and even adopt offensive attitudes over this material.

I can understand that — this is the saddest project I've ever worked on in my life.

This has given me occasion to to consider all the reasons why Generational Dynamics makes otherwise sane people want to go screaming into the hills, and the reasons are numerous:

- You have to give up most of your political beliefs. People are addicted to their politics like crack cocaine. They just hafta love Bush or hate Bush, and credit or blame him for everything. Here in Massachusetts, where almost everyone hates Bush, I've seen people go almost ballistic when I said during the 2004 election campaign that we still would have invaded Iraq if Al Gore had been President in 2003, and that whatever is going to happen in the next few years is going to happen, irrespective of whether Bush or Kerry won, or whether George Bush is President or Hillary Clinton is President. Sorry.
- You have to give up your belief that, among the biggest wars, there are good wars and bad wars. They're neither good nor bad, just as an earthquake or hurricane or tsunami is neither good nor evil. There's no moral

dimension to it. It just is. In particular, evil is not the cause of war. The cause of war is that the population grows faster than the food supply. If you're religious, then blame it on God; if you're not religious, then blame it on Darwin's "survival of the fittest."

- You have to accept that life is a zero-sum game because the population size is limited by the amount of food and other resources. When one person lives, then someone else, somewhere, has to die sooner or later.
- The next few years will see the "clash of civilizations" world war, which will be the worst war that humanity has ever known. After that, in the 2020s, life will be very good for most people, with a strong economy and almost no poverty (since there will be plenty of food for the population reduced by war), and life will be easy because new super-intelligent computer servants will do many of the difficult and dangerous jobs that human beings hate. However, it's hard to see how the human race will continue to exist till the end of the century, since after 2030 or so, however, super-intelligent computers will become the dominant species on earth.
- If you're religious then you have deal with the fact that God created a world in which all the above things are true.

When I see the above list all in one place, it makes me want to go screaming into the hills, so I can understand the effect of Generational Dynamics on other people, even people who should know better. This has led to me to long, philosophical meditations on the question of why it has fallen to me, of all the people on earth, to be the one to deliver this news to the world, but since I'm not a religious person myself, I don't claim to have a clue.

In contemplative times, I do remember the words of the following song, sung by Judy Collins:

**Have you been half asleep and have you heard voices?
I've heard them calling my name.
Is this the sweet sound that calls the young sailors?
The voice might be one and the same.**

**I've heard it too many times to ignore it.
It's something that I'm s'posed to be.
Someday we'll find it, the rainbow connection,
The lovers, the dreamers, and me.**

Here the operative phrase is that this is "something that I'm s'posed to be," for whatever reason. I didn't seek this project out; it sought me out. It seems that everything in my life has pointed me in this direction. My Greek ethnicity allows me to understand the deepest meanings of "tragedy" better than most people

can. My education in mathematical logic was essential. My long time interest in technological forecasting helped me believe that other types of forecasting are possible. My long period of unemployment after 9/11 and the fact that I'm divorced and don't "have a life" gave me plenty of time to work on this. I've had many successes and many, many, many failures in my life, and at age 60 as I look back over my life, it now looks like every job I've ever had, every subject I've ever studied, and every personal and professional failure I've ever experienced have all been necessary prerequisites to my developing this theory. If my life had been more "successful," then this book could never have happened.

I'd like to thank Bill Strauss and Neil Howe for their brilliant work creating the study of the generational paradigm in Anglo-American history. I'd like to thank Mike Alexander for pummeling me ruthlessly with questions about Generational Dynamics, so that I'd have to explain things better, in greater and greater detail, do more and more research, and prove many things that I'd previously only assumed. I'd also like to thank the hundreds of people who regularly read my web site, and often sent me e-mail with supportive comments, and even told me how valuable and interesting the web site is. Finally, I'd like to thank the many people who treated me contemptuously, and thus got me so enormously pissed off that I had to finish this book just to spite them. I probably couldn't have done it without them.

John J. Xenakis

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www.generationaldynamics.com

http://www.GenerationalDynamics.com#>

Chapter 1 - Basics of Generational Dynamics

The major findings of Generational Dynamics begin with the discovery that there are two kinds of wars: crisis (or generational) wars and non-crisis (or mid-cycle) wars.

Crisis wars are cyclic within a society or nation. They're the most horrible kinds of wars. They're so horrible and they traumatize a nation so much that there's unanimous agreement to do everything possible to prevent any such war from ever happening again. When the last generation of people who lived through the crisis war disappear (retire or die) all at the same time, then the nation enters a new crisis period, leading to a new crisis war. That's why a new crisis war typically begins around 60 years after the previous one ends.

In an analysis of over 100 crisis wars in nations around the world throughout history, the number of years from the end of one crisis war to the beginning of the next varied from 40 to 117 years, according to the following table:

# years	Fraction of total
-----	-----
0- 40	0%
41- 49	11%
50- 59	33%
60- 69	25%
70- 79	16%
80- 89	4%
90- 99	6%
100-117	5%

These results, along with the theoretical explanation, are extremely significant, and unfortunately little understood.

The Iraqi war provides the most dramatic recent example. The above table shows that there *cannot* be a massive civil war or anti-American uprising in Iraq, since only about 15 years have passed since the end of the genocidal Iran/Iraq crisis war. Since early 2003, my web site has been mocking and refuting journalists and analysts who were warning about civil war or uprising, and I was consistently right, and they were almost always wrong.

America's crisis wars

Crisis wars are the worst kinds of wars – the genocidal wars.

Some people would argue that America has never fought a genocidal war, but indeed we have – twice since the nation's founding.

The most recent crisis war was World War II. Before it was over, we fire-bombed and destroyed major cities like Dresden and Tokyo, with the intention of destroying the cities and their inhabitants, including millions of civilians. And we dropped nuclear weapons on two Japanese cities for exactly the same reason.

I'm not blaming the Allies for taking these genocidal actions. But I'm making the point that genocidal actions like these always occur in crisis wars. In fact, I don't assign blame to anybody for the actions I describe in this book. I'm simply describing what happens, what always happens.

By contrast, the Vietnam War did not exhibit any of this kind of genocide by the Americans. Let's face it: We could have beaten the Vietnamese if we'd been willing to use nuclear weapons on Hanoi, but nothing like that could ever have happened. (Incidentally, the Vietnam war *was* a genocidal crisis war for the Vietnamese, which explains not only the Tet offensive, but also the massive civil war that engulfed Cambodia in the mid-1970s.)

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Nor did World War I exhibit this kind genocidal behavior in western Europe. I've found that those who compare WW I and WW II rarely have the vaguest idea what WW I was about, and simply assume that it was identical to WW II. I'll give just one stark example of the difference between the two wars: In WW II, Germany and Japan refused to surrender, even when it was certain that they would lose, and even when their cities were being firebombed and millions of civilians killed. But in WW I, Germany capitulated long before it had to; there was no genocidal climax, which is what characterizes a crisis war.

Prior to World War II, America's previous crisis war was the Civil War. At the climax of the Civil War, President Abraham Lincoln OKed a “scorched earth policy”: General Sherman marched through Georgia, destroying all homes and crops so that any survivors starved to death.

This kind of genocidal behavior did not occur in any of America's other wars – the Gulf War, the Vietnam War, the Korean War, World War I, the Spanish-American War, or the Mexican-American war.

Non-crisis wars are political wars – they come from the politicians. They can start at any time a politician decides, and they can end at any time.

Crisis wars come “from the people” rather than from the politicians. They're almost like sex in their emotional ferocity. They recur in any society at roughly 70-90 year intervals. Crisis wars may get off to a bumpy start, but once they pick up speed they can't be stopped, and end with a genocidal fury.

Here are some other examples of crisis wars:

- When a historian uses the phrase “spiraled out of control” to talk about a war, then it's probably a crisis war. The French Revolution is a good example: A general desire by the French people to punish the aristocrats who had brought the country to bankruptcy in 1789 spiraled out of control into a massacre, a Reign of Terror where anyone who had even been associated in any way with an aristocrat became a victim of the guillotine.
- In the early 1990s, Serbs launched an ethnic cleansing campaign against the Croats and the Bosnians in the Balkans. These were all people who had lived together in the former Yugoslavia. They were neighbors, they had intermarried, their kids went to school together, and so forth. But the Serbs launched a campaign to mass-murder the men, bury them in mass graves, and mass-rape the women.
- In 1994 Rwanda, not only did the Hutus mass-kill and mass-rape their Tutsi neighbors, but they went a step further and hacked off their arms, legs and heads, and made piles of various body parts in different places.

Crisis wars are embedded in human nature, and are part of the “survival of the fittest” process. Throughout history, it's crisis wars have permitted people of one religion or ethnic group to annihilate people of a different religion or ethnic group.

These are wars that come “from the people,” rather than from the politicians. Wars that come from politicians are never that ferocious; for America, the Gulf War, the Vietnam War and World War I came from the politicians, and were ill-supported by the people, resulting in enormous political controversy. But there was little political controversy for World War II or the Civil War.

It's the crisis wars, the ones that come from the people, that are embedded in human nature, that are part of the process of “survival of the fittest” of different tribes, religious, ethnic groups and nations. Like it or not, these are the wars that are as much part of being human as sex is.

And, like sex, crisis wars always end with a major explosive crisis. A crisis war is like a ball rolling downhill. It may get off to a slow start, it may bounce around for a while, it may stop and start, but after a while it starts gathering speed.

I like the analogy that Leo Tolstoy used, as he described the momentum that drove the French forces to Moscow:

The forces of a dozen European nations burst into Russia. The Russian army and people avoided a collision till Smolensk was reached, and again from Smolensk to Borodino. The French army pushed on to Moscow, its goal and its impetus ever increasing as it neared its aim, just as the velocity of a falling body increases as it approaches the earth. Behind it were seven hundred miles of hunger-stricken, hostile country; ahead

were a few dozen miles separating it from its goal. Every soldier in Napoleon's army felt this and the invasion moved on by its own momentum.

The more the Russian army retreated the more fiercely a spirit of hatred of the enemy flared up, and while it retreated the army increased and consolidated. At Borodino, a collision took place. Neither army was broken up, but the Russian army retreated immediately after the collision as inevitably as a ball recoils after colliding with another having a greater momentum, and with equal inevitability the ball of invasion that had advanced with such momentum rolled on for some distance, though the collision had deprived it of all its force.

Tolstoy disputes historians who claim that Napoleon might have won the battle of Borodino and changed the course of history if he hadn't had a cold that day. Tolstoy rejects any such concept, and says that these battles and wars go on because of their own unstoppable momentum.

Many historians say that the French did not win the battle of Borodino because Napoleon had a cold, and that if he had not had a cold the orders he gave before and during the battle would have been still more full of genius and Russia would have been lost and the face of the world have been changed. ...

If it had depended on Napoleon's will to fight or not to fight the battle of Borodino, and if this or that other arrangement depended on his will, then evidently a cold affecting the manifestation of his will might have saved Russia, and consequently the valet who omitted to bring Napoleon his waterproof boots on the twenty-fourth would have been the savior of Russia. ... [That] argument seems not merely untrue and irrational, but contrary to all human reality. To the question of what causes historic events another answer presents itself, namely, that the course of human events is predetermined from on high - depends on the coincidence of the wills of all who take part in the events, and that a Napoleon's influence on the course of these events is purely external and fictitious. ...

[S]trange as it may seem to suppose that the slaughter of eighty thousand men at Borodino was not due to Napoleon's will, though he ordered the commencement and conduct of the battle and thought it was done because he ordered it; strange as these suppositions appear, yet human dignity - which tells me that each of us is, if not more at least not less a man than the great Napoleon - demands the acceptance of that solution of the question, and historic investigation abundantly confirms it.

At the battle of Borodino, Napoleon shot at no one and killed no one. That was all done by the soldiers. Therefore, it was not he who killed people.

The French soldiers went to kill and be killed at the battle of Borodino, not because of Napoleon's orders but by their own volition. The whole army - French, Italian, German, Polish, and Dutch - hungry, ragged, and weary of the campaign, felt at the sight of an army blocking their road to Moscow that the wine was drawn and must be drunk. Had Napoleon then forbidden them to fight the Russians, they would have killed him and have proceeded to fight the Russians because it was inevitable.

Tolstoy's is an extremely powerful insight into the nature of what we call a crisis war.

The fact that historians have been unable to generalize this concept into an understanding that there are two different kinds of wars is a source of constant amazement to me, because the difference between crisis and non-crisis wars is as plain as the nose on your face.

The genocidal nature of World War II and the Civil War is clear and stark to anyone who thinks about it. The political, and decidedly non-genocidal nature of Vietnam, WW I, and other wars, is just as clear and stark.

Even professional historians have difficulty understanding this distinction, and that may simply be because of the nature of historical study itself.

Historians get their kicks out of validating the tiniest details about past times. Did Lincoln have fried eggs for breakfast on the day he signed the Emancipation Proclamation? Proving or disproving that claim would be a major find in the world of historians. Thus, if a 1920s book says that he did eat fried eggs, but a more modern discovery showed that he had pancakes instead, then it's worth throwing a party to celebrate.

This attention to the tiniest detail is both the strength and the weakness of historians. The distinction between crisis and non-crisis wars is a big picture kind of thing, but historians miss the differences because they can't step back and look at the bigger picture.

This was illustrated in a discussion I had with a history professor. I compared World War II to the Vietnam War. I said something like, "We dropped nuclear weapons on Japan in WW II, but in the Vietnam War we prosecuted soldiers for harming civilians."

Well, he got all excited. "No, we didn't prosecute all the soldiers who harmed civilians in Vietnam. There were a lot more soldiers who didn't get prosecuted."

Listening to him I got this weird feeling that I always get that people are sometimes totally oblivious to what's going on. I stared at him for a second, and then raised my voice a little. "WE DROPPED NUCLEAR WEAPONS ON JAPANESE CITIES!"

I hope he got the point. It's like not being able to tell the difference between a summer drizzle and a raging typhoon because you're focusing on only one raindrop at a time.

I was trying to explain that it didn't matter how many dozens of soldiers were or were not prosecuted for harming civilians in the Vietnam War, because the number was tiny compared to the huge masses of civilians who were killed in the explosive ending to World War II.

This little anecdote illustrates some of the difficulties I've found in explaining Generational Dynamics to a general reader, even someone with the background and discipline of a professor of history.

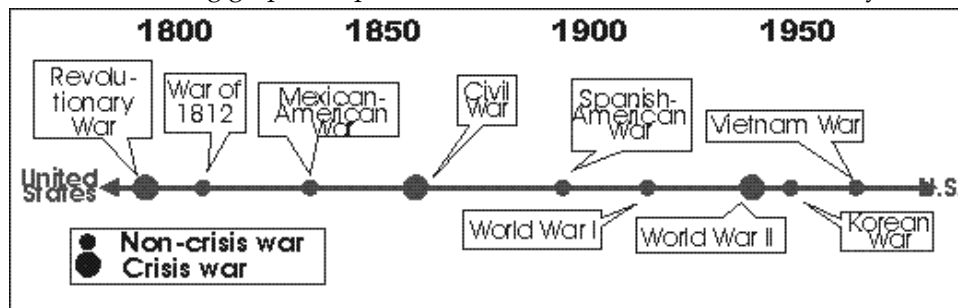
I've now had over three years of experience in understanding and evaluating crisis wars, and I've found that if you look at the big picture about a war, then it's rarely difficult to evaluate it as a crisis or non-crisis war.

However, in chapter xxx (p. 189), there is a detailed evaluation algorithm that anyone with sufficient understanding of history can use.

Relationships between crisis and non-crisis wars

Once the existence and frequency of crisis wars has been established, the next task is to show how crisis and non-crisis wars relate to each other through history.

The following graphic depicts both kinds of wars in America's history:



American crisis and non-crisis wars

What we're discussing is the following: That a country has a crisis war every 80 years or so – at exactly the time that the generation of people who lived through the last crisis war, and have a personal memory of it, all disappear (retire or die), all at approximately the same time.

The interval 80 years is only approximate, and it represents the approximate length of a maximum human lifespan (which has been fairly constant for millennia). In actual practice, most crisis wars are 70-90 years apart, and occasionally they're as little as 60 or as many as 100 years apart. In the hundreds of cases I've

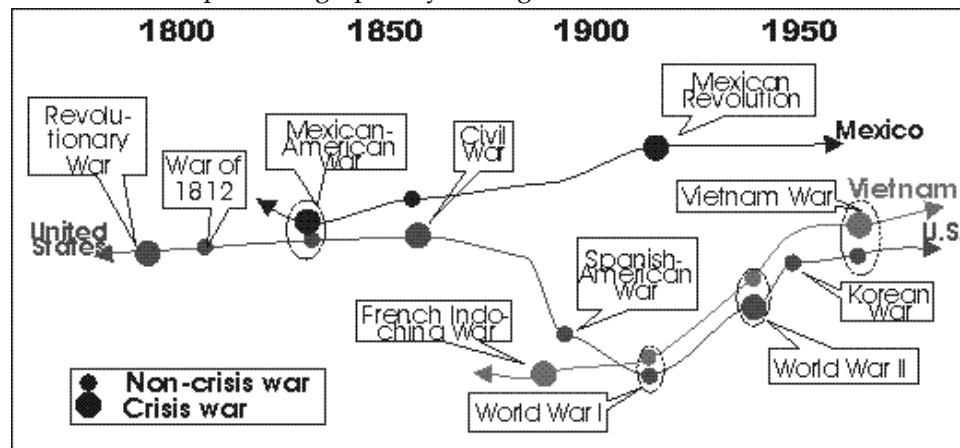
looked at, there has never been a case where a new crisis war began less than 40 years after the end of the previous one.

Thus, on the American timeline, the Civil War occurred 86 (=1861-1775) years after the Revolutionary War, and World War II began 80 (=1941-1861) years after the Civil War.

Crisis wars in other countries

The previous graphic shows the crisis and non-crisis wars for America during the last two centuries.

Now let's expand the graphic by adding Mexico and Vietnam to it:



America, Mexico, Vietnam: Crisis and non-crisis wars

(We are not displaying all wars in other countries; to do so would make the diagram too complex to read.)

This graphic shows some interactions between America and the other two countries.

In 1848, Mexico and the U.S. fought the Mexican-American war. This was a minor war for the U.S., which is why we've labeled it a non-crisis war.

But from Mexico's point of view, this was no minor war. Mexico was invaded and occupied by American forces, and dealt with several internal uprisings, including a war with Mayan Indians in the Yucatan, culminating in a massive peasant revolt in Queretaro.

This illustrates a very important point: That two countries might fight in the same war, but the war can look very different to them.

It's just like a husband and wife having an argument over money or sex. Any husband and wife can tell you that they might be having an argument, but it later turns out that they were arguing over completely different things that nei-

ther of them understood at the time. There are hundreds of “relationship books” available on subjects like this.

Similarly two countries may fight the same war, but if you look at the war from the separate points of view of the two countries, it's almost as if they're two completely different wars.

In order to understand Generational Dynamics, you have to do something most people don't do: You have to look at things from the point of view of other people, other nations. You can read the history of almost any war ever, and the description from the different sides will make it seem like different wars.

So later we'll be describing how to evaluate a war to determine whether it's a crisis or non-crisis war, and it will be necessary to evaluate the war separately for each country fighting in the war.

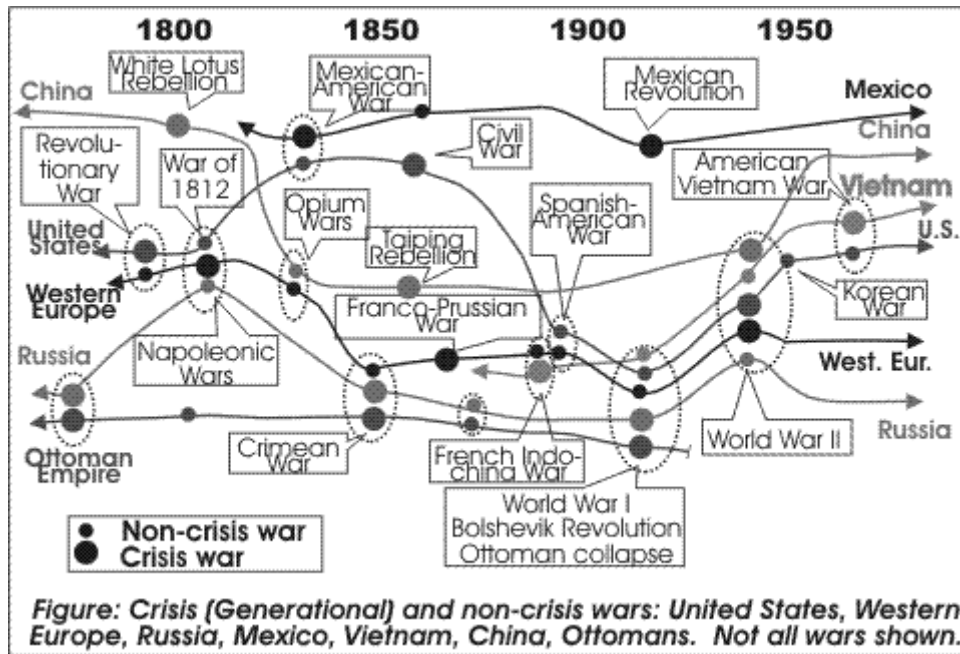
Returning now to the last graphic, we can see that the Mexican-American war was a crisis war for Mexico, and that the next crisis war was the Mexican Revolution, which began 64 (=1911-1846) years after the Mexican-American war.

The same kind of story applies to Vietnam. Our Vietnam war was a political disaster. America was not united – it was polarized, with antiwar riots on college campuses, “days of rage” on the streets.

But not so for the North Vietnamese. This was total war for them. They were willing to sacrifice everything to win this war. And it didn't end with the Vietnam war: During the 1970s there was a massive genocidal civil war in Cambodia that killed millions of people.

So our Vietnam war was a non-crisis war, but it was a crisis war for the Vietnamese. It occurred a little over 80 years after their last crisis war - the French Indochina war of the 1880s and 1890s.

Finally, let's add Western Europe, Russia, and the Ottoman Empire to the graphic:



Crisis and non-crisis wars for several countries and regions

This graphic shows numerous wars among these countries, and the type of war for each country.

This diagram is, I believe, a fascinating way to look at wars. Instead of seeing wars as more or less random events that occur at various times, the above diagram organizes wars and shows their relationship in a way that adds to our understanding.

What is genocide?

In developing Generational Dynamics, I had to come up with a solid working definition of genocide. This isn't the standard legal or dictionary definition, but my research indicates that it's closest to what genocide really is.

I needed this definition because I needed a method for identifying crisis wars. A basic principle of Generational Dynamics is that every nation has a genocidal crisis war every 70-90 years, and this has been shown to be true in over 100 cases in dozens of countries throughout history. This requires a solid definition of "genocidal" that can be applied to any war at any place and time in history to determine whether or not it's genocidal.

The concept that I want "genocide" to capture is this: Actions that value protecting the society so much higher than protecting individual lives that an indi-

vidual life, even of people in the society itself, is considered to be almost valueless.

Here are some of the factors that indicate that a war exhibits this kind of genocidal violence:

- Highly secretive mobilization, with the intent to hide from other countries the war intention
- A massive surprise attack on the enemy
- A pursued desire for “ethnic cleansing”
- A sustained program of mass murders, mass rapes, massacres, torture, destruction of entire towns (with inhabitants), forced relocation of huge populations of people - sustained over a period of months (a single battle doesn't count)
- “Scorched earth policy” that kills as many civilians as possible, leaving the survivors to starve or die from exposure. This involves burning of villages, and destruction of wells and crops.
- Nation at end is “devastated” or perpetrates devastation
- A “D-Day” type mass assault, a willingness to sacrifice one's own forces for victory. This includes regular use of “suicide terrorism” and such things as the Japanese kamikazes.
- “Spiraling out of control”
- A refusal to capitulate, a willingness to fight to the death, even when defeat is almost certain

In World War II, genocidal acts by the Germans included: The Holocaust (execution of millions of Jews), and Hitler's refusal to capitulate when it was clear that Germany would lose. Genocidal acts by Japan included: Murder and torture of prisoners of war at Bataan; refusal to capitulate when it was clear that Japan would lose; Genocidal acts by America included: Massive D-day assault (willingness to risk everything for victory); firebombing Dresden and Tokyo; use of nuclear weapons on Japanese cities.

In the American Civil War, General Sherman's march through Georgia in 1864 was a genocidal act, since it involved a “scorched earth policy” that killed as many civilians as possible.

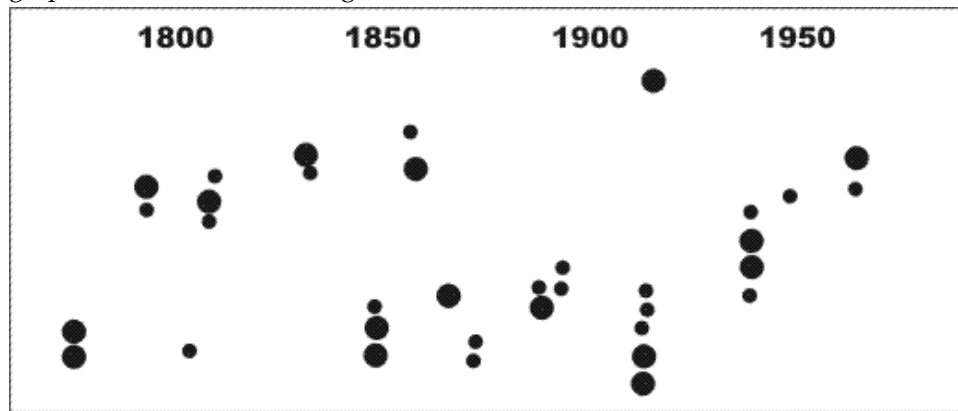
From the point of view of Generational Dynamics, genocide is a force of nature, and is neither good nor evil, any more than an earthquake or tsunami is good or evil. This may seem a heartless way of looking at it, but everything about crisis wars is heartless.

Stock Cycles, Long Waves and Kondratiev Cycles

Various authors have attempted to discern war cycles throughout history, without much success. Usually these are attempts to relate wars to economic growth cycles in some way, such as to economic upswings and downswings, and variations in stock prices or currency values.

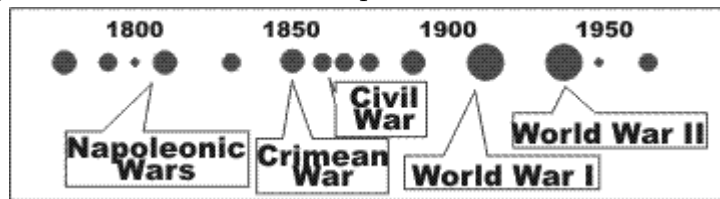
Generational Dynamics shows why such attempts *must* fail: There are two kinds of wars, and it makes no sense to try to discern cycles without separating the two kinds of war.

The above graphic makes this point: Suppose you remove the lines from the graphic, and color all the large and small dots black:



Previous diagram, with local structures removed

In this form, it's much harder to see a pattern. But let's take it a step further, and merge the dots from the same time period:



Previous diagram, with common wars merged

In this form, there's no longer any pattern whatsoever. Comparing this with the next-to-last diagram, you see that a great deal of information has been lost.

And yet, this is the form that most researchers use. They don't consider each country separately, and so they have to struggle to try to find patterns in wars around the world.

It's only when you can trace the path along each country line do you see each the cyclic pattern for each country. This illustrates why it's impossible to detect cycles or patterns in wars generally. The patterns arise only on a local basis.

This is the Generational Dynamics *Principle of Localization*. It says that generational patterns can be found on a local basis, not on a global basis.

In chapter xxx, we'll do some additional modeling to show the following:

- Generational financial cycles have a cycle length of roughly 70-90 years
- Technology cycles have a cycle length of roughly 50 years.

Authors of various stock market and wave theory schemes, including Kondratiev cycles, err when they fail to separate out these two different kinds of cycles. We'll use a simple model to show that technology cycles dominate up until around 1850, and generational cycles dominate since then, which explains the behavior of various cycle schemes.

Problems for review and research

1. Write an essay describing, in your own words, the differences between crisis and non-crisis wars.
2. Research all the American wars, and list as many things that you can that distinguish crisis and non-crisis wars.
3. Pick another country of interest to you and find the crisis and non-crisis wars for the last 100-200 years.
4. Read up on Kondratiev Cycles, and determine the cycles for America in the last two centuries. Using the same methodology, recompute the cycles without including the effects of the Civil War, the Panic of 1857, the Great Depression, and WW II.

Chapter 2 - Crisis Wars, Awakenings and Generations

This chapter presents a summary of the theoretical support for Generational Dynamics.

Crisis Wars

The major findings of Generational Dynamics begin with the discovery that there are two kinds of wars: crisis (or generational) wars and non-crisis (or mid-cycle) wars.

Crisis wars are cyclic within a society, region or nation. They're the most horrible kinds of wars. They're so horrible and they traumatize a nation so much that there's unanimous agreement to do everything possible to prevent any such war from ever happening again. When the last generation of people who lived through the crisis war disappear (retire or die) all at the same time, then the nation enters a new crisis period, leading to a new crisis war. That's why a new crisis war typically begins around 60 years after the previous one ends.

Some people may think that America has been immune to genocidal crisis wars, but in fact there have been two since the nation's founding.

America's most recent crisis war was World War II. Before it was over, we firebombed and destroyed major cities like Dresden and Tokyo, with the intention of destroying the cities and their inhabitants, including millions of civilians. And we dropped nuclear weapons on two Japanese cities for exactly the same reason.

I'm not blaming the Allies for taking these genocidal actions, especially since our enemies would have done the same to us. But I'm making the point that genocidal actions like these always occur in crisis wars, and every nation and society has these crisis wars throughout it's history. Crisis wars are fundamental to human DNA, and are a requirement of "survival of the fittest."

Other 20th century wars did not exhibit anything like this kind of genocidal fury. America didn't use nuclear weapons in the Vietnam War, and in fact the war was stalled by bitter political recriminations, which is typical of non-crisis wars. And World War I had no such genocidal fury either, and in fact was mostly a static war in the West, which ended when Germany unexpectedly capitulated, long before it had to.

Prior to World War II, America's previous crisis war was the Civil War. At the climax of the Civil War, President Abraham Lincoln OKed a "scorched earth policy": General Sherman marched through Georgia killing not only everyone in sight, but also destroyed all homes and crops so that any survivors starved to death.

This kind of genocidal behavior did not occur in any of America's other wars – the Gulf War, the Vietnam War, the Korean War, World War I, the Spanish-American War, or the Mexican-American war.

The latter wars are non-crisis wars. Non-crisis wars are political wars – they come from the politicians. They can start at any time a politician decides, and they can end at any time.

Crisis wars come "from the people" rather than from the politicians. They're almost like sex in their emotional ferocity. They recur in any society at roughly 70-90 year intervals. Crisis wars may get off to a bumpy start, but once they pick up speed they can't be stopped, and end with a genocidal fury.

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About 55-60 years after one crisis war ends, the last generation of people who have personal memories of the genocidal horrors of the preceding crisis war all disappear (retire or die), all at roughly the same time, and the country enters a "generational crisis" period. This appears as a substantial change in attitudes in the public in general. We've already begun to see this in America, with the surprising and unexpected rise of "moral values" as a factor in the 2004 Presidential election. Whenever any country enters a generational crisis period, public opinions continue to harden until a new crisis war breaks out.

Frequency of Crisis Wars

We've said that crisis wars tend to occur in 70-90 year cycles in each society, region or nation, but let's be more specific.

In studying the frequency of crisis wars, we've found that the most useful figure to study is the number of years from the end of one crisis war to the beginning of the next.

In an analysis of over 100 crisis wars in nations around the world throughout history, the number of years from the end of one crisis war to the beginning of the next varied from 40 to 117 years, according to the following table:

# years	Fraction of total
-----	-----
0- 40	0%
41- 49	11%

50- 59	33%
60- 69	25%
70- 79	16%
80- 89	4%
90- 99	6%
100-117	5%

These figures give an idea of the distribution of crisis wars, and permit an estimate of how frequently crisis wars occur.

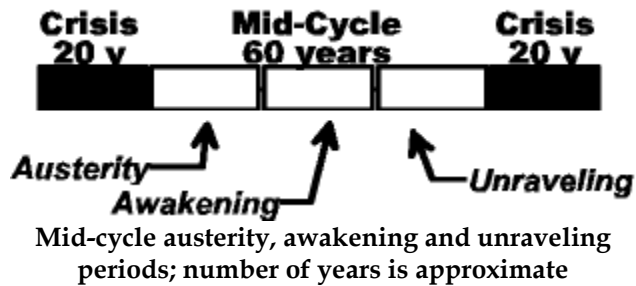
Crisis and non-crisis eras - Turnings

The crisis wars are like huge markers on the timeline of history. In between those markers are smaller markers for other significant events. Generational Dynamics has a rich supporting theory that explains how one crisis war leads to the next.

The rich supporting theory is based on work done by historians William Strauss and Neil Howe in the 1980s and early 1990s on generational changes in Anglo-American history. They developed their work by studying hundreds of histories and diaries through Anglo-American history dating back to the 1400s.

Their work is documented in two books, www.amazon.com/exec/obidos/ASIN/0688119123 "*Generations: The History of America's Future, 1584 to 2069*"# and www.amazon.com/exec/obidos/tg/detail/-/055306682X "*The Fourth Turning: An American Prophecy*"#>.

Based on Strauss and Howe's research, Generational Dynamics identifies crisis and non-crisis periods during a complete generational cycle, or saeculum. These periods are also called "eras" or "turnings." They are:



- **First Turning – Austerity Period or High Period.** When a crisis war ends, new emotions take over in the public. There's a relief that the country survived, there's acceptance of the victory or defeat and the compromises that were required, there's guilt and controversy at the atrocities committed by them and fury at atrocities committed by others, and most of all there's a determination that no such war must ever happen again.

This is often a period of great prosperity, since there's plenty of land and food for the smaller population that survived the war, and there's a willingness to impose austere societal rules to guarantee that the nation will be safe from that time forward. (America's most recent austerity period began in 1945.)

- **Second Turning – Awakening period.** About 15-20 years into the Austerity Period, the kids who were born *after* the crisis war, and who have no personal memory of the horrors of that war, come of age. They see no reason to suffer under the austere rules imposed by their parents, and they rebel, creating a “generation gap.” The resulting political furor is the rebirth of individual rights (women's rights, minority rights, and so forth), as opposed to the austere rules whose purpose is to protect society as a whole. The Awakening period often ends in an “internal revolution” or “velvet revolution” or “bloodless coup” or a harsh crackdown. This event establishes the victory of one generation or the other, and sets the pattern for the unraveling to come. (America's most recent Awakening period was the 1960s-70s. Iran and Iraq are in Awakening periods today, thanks to being one generation past the Iran/Iraq war of the 1980s.)
- **Third Turning – Unraveling period.** During this period, all the painful compromises and rules that ended the last crisis war come completely unraveled. It's each man or woman for him or herself, as individual rights are king. Society has no direction or purpose except to preserve the *status quo*. Problems are papered over, resolved by compromise and containment. (America's last Unraveling period was the 1980s-90s. China is in an unraveling period today.)
- **Fourth Turning - Crisis Period.** When all the people who lived during the previous crisis period disappear (retire or die) all at once, then a major generational change takes place: The nation's leaders are all from the generations born after the last crisis war. Through the third turning, the people who had gathered a great deal of wisdom from having lived through the last crisis war have guided the nation carefully, making sure that disasters are avoided. But in the Fourth Turning, that wisdom is all lost, and the new leaders literally don't know how to run things; all they know how to do, it turns out, is to express outrage when something goes wrong. The new Crisis period often begins with some surprise – such as a financial crisis (1929 stock market crash) or a terrorist act (9/11). The next crisis war begins a few years after the crisis period begins. (America and most countries that fought in World War II are currently in a Fourth Turning.)
- **Fifth Turning - Supplementary crisis periods** This is a recent theoretical addition to Generational Dynamics, and it occurs only when a society

goes through an entire Fourth Turning with no crisis war. It is discussed further below.

In the “standard” case, a cycle goes through four turnings, each approximately 20 years long, for a total cycle length of 80 years. But there's a great deal of variation. Some turnings may be unexpected short or long, and if there's no crisis war during the Fourth Turning, then there will be a Fifth Turning, when a crisis war will occur with all but absolute certainty.

Generations

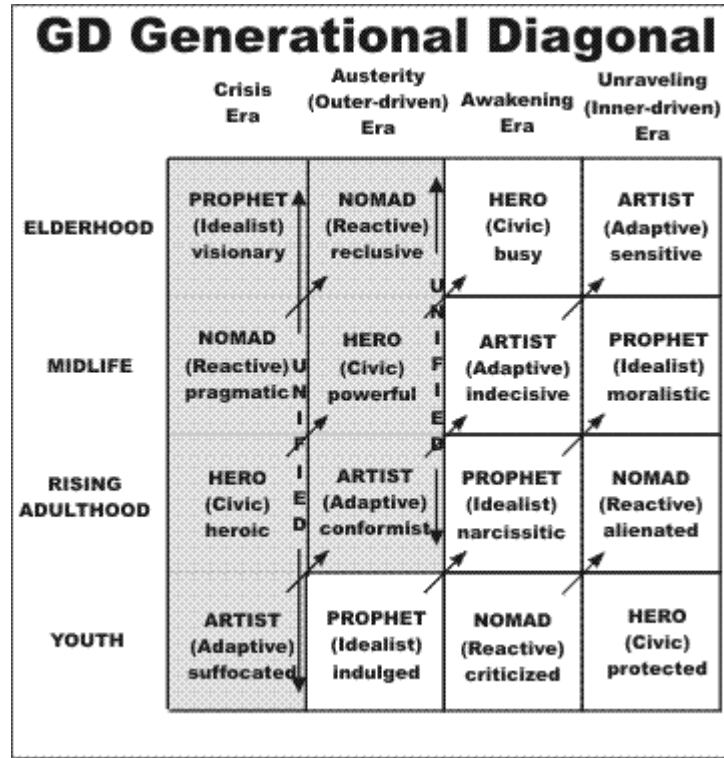
Children born in these different periods grow up with characteristics unique to their generation. The differences between people in the same generation are much smaller than the differences between generations.

Strauss and Howe identified the following four generational archetypes, and found that the repeat through the Anglo-American timeline:

- **Hero Generation.** These kids are born just before the crisis war, so they're the young soldiers who fight in the war. The traumatized survivors rebuild a prosperous society from the ruins of the war, and impose austere rules to prevent any such war from every happening again. During the Second Turning (the Awakening period), they're the older generation in the generation gap. The Heroes are so traumatized by the war that they become too authoritarian and drive their children away from them. They grow old being lonely and estranged from their children. (Last American Hero generation was World War II's “Greatest Generation.” The next hero generation are today's youth, born in the 1980s-90s.)
- **Artist Generation.** These kids grow up during the crisis war, and suffer a kind of generational child abuse. Like all abused children, they grow up to be indecisive and risk-averse. They're caught in the middle of the generation gap during the awakening, and they come to power during the Unraveling, where they paper over problems because of their indecisiveness. They grow old feeling guilty and being blamed for all the short-sighted “indecisive” compromise decisions they made. (America's last Artist Generation was the “Silent Generation,” born during WW II.)
- **Prophet Generation.** These kids grow up during the Austerity period, and start early to rebel against their parents. By the Awakening period, they lead college students and disaffected youth into full-fledged political rebellion against their Hero generation parents. They win this battle because, after all, the Heroes retire and die. Arrogant, narcissistic and sure of themselves, they dominate society through the Unraveling period, when nothing, including the nation as a whole, is as important as the individual. Once the indecisive Artists retire, the Prophets' arro-

gance and rage against their now-deceased parents turns to indignation and rage against their Hero parents' old enemies in the last crisis war. With all the old compromises unraveled, the Prophets lead the nation into a new crisis war. (America's last Prophet generation was the Baby Boomers, born after WW II.)

- **Nomad Generation.** These kids grow up during the social turmoil of the Awakening period, and become angry, disaffected youth. Throughout Anglo-American history, the Nomads have been shown to have the highest crime rate. They spend their lives in the shadow of the powerful Prophet generation. The Prophets excoriate the disaffected Nomads, and the Nomads return the favor by hating the older Prophets. And the Nomads end up being more powerful than the Prophets during the next crisis war, because although Prophets provide the vision, Nomads pick and choose among the Prophets and decide which of their visions to implement. Remarkably, some of the world's worst dictators are early Nomads (born 16-25 years after the end of the last crisis war), including Adolf Hitler, Josef Stalin, Leon Trotsky, Osama bin Laden, Abu Musab al-Zarqawi, and Shamil Basayev (the guy who masterminded 2004's Beslan school massacre). While Prophets are visionaries, Nomads are doers, and they implement the programs that lead the nation into the next crisis war. They blame the crisis war on the Prophets, and grow old becoming bitter and reclusive. (America's current Nomad generation is often called "Generation X.")



The Generational Dynamics Diagonal Flow Diagram

The above diagram ties everything together by showing how generations change through the entire cycle. The adjective labels in each square are brief descriptions of the generations in different eras of their life cycle. For example, people in the Artist generation are “suffocated” as they grow up during a crisis period, are “conformist” as young adults, “indecisive” during the Awakening when they’re trapped between the two warring generations, and are “sensitive” elder leaders.

Several squares have been darkened in the above diagram to make the point that the generational paradigm is extremely robust and flexible, and corrects itself very quickly after a perturbation.

Suppose that an unexpected invasion or other crisis occurs that literally puts the society in mortal danger at other than the “scheduled” time. Then the society is in the left-hand column with the wrong generations in place. However, at the time of such a crisis, all generations must unite for survival, so generational differences are muted. This unity continues through the Austerity period, and only comes apart during the political conflicts of the Awakening period. But whatever their generational archetype when they entered the Crisis period, they’ll become heroes for having fought in the crisis war. The youth generation will be

Artists for having grown up during a crisis war. By the Awakening period, the other two generations will have disappeared (retired or died).

This shows that if a perturbation occurs in a society, even a huge perturbation like an unexpected crisis war, then the generational change pattern corrects itself very quickly.

New research in generational theory

The foundational work in generational theory was done by Bill Strauss and Neil Howe studying diaries and histories written contemporaneously by the people in the actual generations they were studying. They showed that the generational archetypes (Hero, Artist, Prophet, Nomad) occur repeatedly throughout history, always cycling in exactly that order.

Strauss and Howe's work is powerful and fascinating because it provides insight not only into the history of our country, and also into our own personalities, as it helps us understand how generations affect us all. If you wish to understand the flow of American generations, including your own place within recent generations, the above books are good sources.

However, they imposed substantial restrictions on their theory. They say that it applies only to Anglo-American society. They say that it's restricted to modern societies where, "as in America, generations are left free to develop and express their own personalities." According to the authors, the model can't apply to pre-modern societies, or even for most modern societies. However, they suggest that other modern societies should be tested by reading histories, biographies and diaries written by people in those nations.

Generational Dynamics begins where Strauss and Howe leave off, and removes the restrictions. While they base the generational cycle on Awakening periods, Generational Dynamics redevelops the theory starting from crisis wars, and shows that the generational paradigm applies to all societies, regions and nations throughout history.

Principle of Localization and Merging Timelines

These are the major concepts that permit Generational Dynamics to apply to all tribes, societies, regions and nations throughout history.

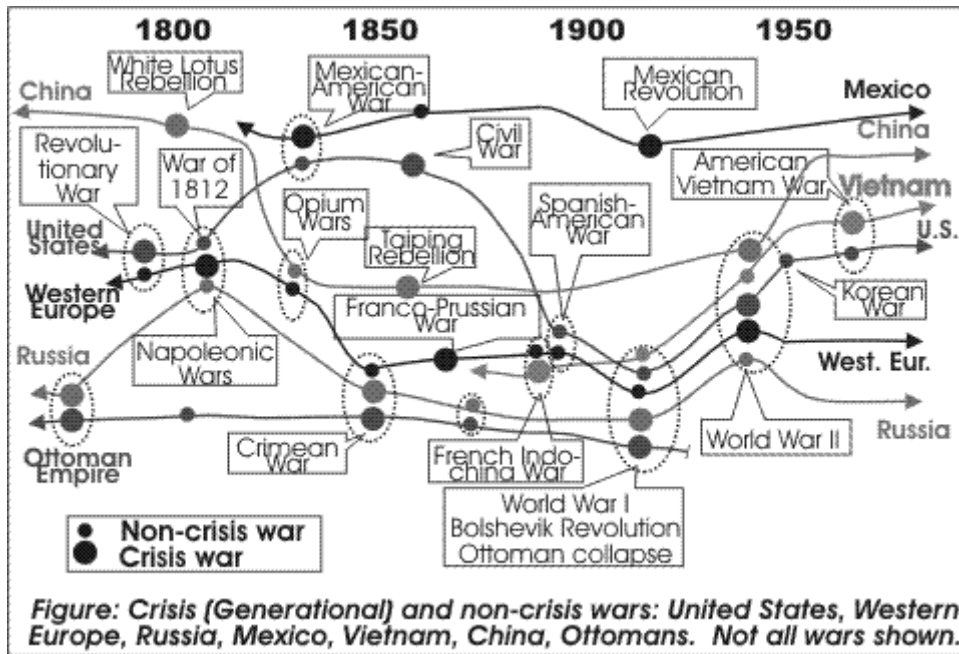
The Principal of Localization says that generational timelines are local to each society, region or nation.

The second principle is that different regions' timelines can merge into a single timeline. This usually happens when the two regions have a crisis war with

each other. The two can diverge again – which happens when one of the regions has a next crisis war with some other nation. But mostly timelines merge over the centuries.

In the thousands of years of recorded history, there have been thousands, or tens of thousands, of individual tribes or societies formed by primitive men and women moving from place to place. Today, there are about 250 nations, comprising about 9 major civilizations* (Western, Latin American, African, Islamic, Sinic, Hindu, Orthodox, Buddhist, Japanese).

Thus, tribes, societies and nations have physically merged, but the Merging Timelines principle says that their timelines have merged as well. Indeed, what I've shown in my previous book and this one is that, over the millennia, timelines have merged into two major ones in the twentieth century: The World War I timeline and the World War II timeline.



Crisis and non-crisis wars for several countries and regions

The above graphic shows that the timelines of many countries of the world have merged into two major timelines, one climaxing in WW I and the other climaxing in WW II. Some countries participated in both world wars, but no country participated in both as a crisis war. Generally speaking, WW I was a crisis war for Eastern European countries, and WW II was a crisis war for West European countries. Today, we're approaching the “clash of civilizations” world war, which will merge these last two major timelines into one.

New Research: Suicide bombers and (STAMP: Friday, December 2, 2005, 12:15:31)

Problems for review and research

1. Write a 2,000 word essay telling, in your own words, how a society or nation cycles from one crisis war to the next.
2. Determine what generation you're in. What are your personal characteristics that are consistent or inconsistent with that generational template?
3. Find someone in your family or a friend's family who was born before 1930 to interview at length. How do your attitudes differ from his or hers? Topics include feeling frightened and terrorized during the 30s and 40s, attitudes towards Communism in the 30s, 40s and 50s, attitudes about the Korean War, attitudes about the racial, environmental, women's lib and antiwar movements in the 60s and 70s, and attitudes towards life during the 1990s.
4. Research America's previous Awakening periods – the 1820s and 1890s. How were they the same or different in comparison with the 1960s?
5. Research a historical period of interest to you. Identify the crisis and non-crisis wars, and the awakening periods. What did those awakening periods have in comparison with the 1960s?

Chapter 3 - Visceral Causes of Crisis Wars

In a previous chapter (p. 27) we discussed the question of what “genocide” is, from the point of view of Generational Dynamics, emphasizing the fact that our definition wasn't the standard legal or dictionary definition.

We're now going to turn to the question of the “causes of war,” and the Generational Dynamics analysis won't exactly correspond to the historians' meaning again.

Actually we'll be focusing specially on crisis wars. We have no particular quibble with the historians' view of the causes of non-crisis wars, but for crisis wars the situation is completely different.

Terminology describing cause of war

When talking about crisis wars, we will use the following terminology:

First, there's the **political cause of war**. This is the cause of war that historians usually point to, although there may be disagreement.

What we've found is that every war has a political cause — or several political causes. And we've found that for non-crisis wars, the political cause is usually the right one. In non-crisis wars, the politicians make a decision, usually based on some sort of logical reasons, they're usually fairly public about the reasons, and they go to war for those reasons.

But for crisis wars, the political cause, more often than not, is inadequate as an explanation. Indeed, the political cause is often more a pretext than a reason. Non-crisis wars come from the politicians, but crisis wars come from the people. Crisis wars are unrestrained and genocidal. Crisis wars are based on emotions, especially hatred.

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Thus, for crisis wars we look for a **visceral cause of war**, something that would make someone want to leave the comforts of home and go out and kill someone. Why did the Hutus go out one day and rape, torture, kill and dismember a million Tutsis in Rwanda in 1994? There's no political explanation for that, although one can be found if you try hard enough. (Some people blame the massacre on identity cards that the Belgian colonizers had once required.)

We use the word **trigger** to refer to the event, often a surprise event, that causes hostilities to begin. Some people will call it the “cause” of the war, but it's really a catalyst, not a cause.

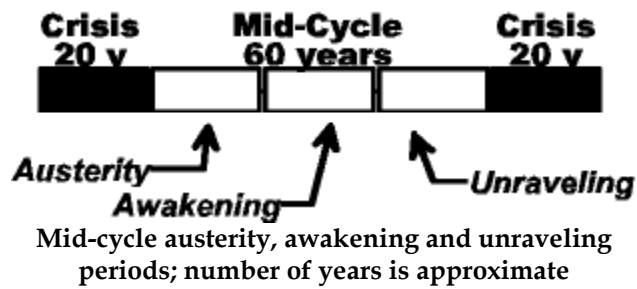
Some examples of triggers are: That assassination of the Archduke Francis Ferdinand at Sarajevo on June 28, 1914 triggered WW I; a plane crash triggered the 1994 Rwanda war; the Thirty Years' War was triggered on May 23, 1618, by the "Second Defenestration of Prague" (when two politicians were thrown out the window of a castle into a ditch).

The last word we'll introduce is **agent**. For example, many people will say that Hitler *caused* WW II, but as we explained in detail in our last book, WW II would have occurred with or without Hitler. (When someone tells me that Hitler caused WW II, I usually follow up by asking him if he knows why Hitler decided to bomb Pearl Harbor.) We would call Hitler an *agent* that led WW II.

Incidentally, we use the term "agent" in other environments as well. For example, if Thomas Edison had never been born, then the light bulb would have been invented by someone else at almost exactly the same time. If Martin Luther King had never been born, then someone else would have led the civil rights movement at the same time. Thus, Thomas Edison and Martin Luther King were "agents of change," but were not the "causes of change."

Visceral causes of today's crisis period

As described earlier, there are three mid-cycle periods between crisis periods: the austerity period, the awakening period, and the unraveling period. It's during the unraveling period that individual rights have the highest political priority, and problems are resolved with the maximum intent of compromise and containment.



The crisis period begins with a generational change - when the people who lived through the last crisis war all disappear (retire or die), all about the same time. In America, this appears to have started in the late 90s, and taken effect around 2000.

During a crisis period, the national attitude changes dramatically. When a new problem arises, instead of evoking a desire to contain the problem and compromise, it evokes visceral feelings of anxiety, terror and fury throughout the population.

I noticed this even before 9/11, at the outpouring of national fury against all CEOs after the Enron scandal in Fall of 2000. If there had been a guillotine in Washington in 2000, then the people would have sent every CEO in the country

to the guillotine (as in the reign of terror in France in 1793). Then after 9/11, Bush's immediate response was to invade Afghanistan, a response which was universally supported. I've always considered the reaction to the Enron scandal and the reaction to 9/11 to be two aspects of the same phenomenon that occurs during a crisis period: A widespread desire for justice and revenge instead of compromise and containment.

So, in today's America, we see two different reasons for the visceral anxieties that create a desire for revenge that can lead to the next crisis war:

- A financial crisis can make people feel that their lives, and their families' lives, are in danger from starvation or homelessness. There is a desire for revenge against the people who are perceived to have caused the financial crisis.
- A terrorist act can make people feel that their way of life is threatened.

When you look at these visceral causes, you can see why a generational change is required. People who had lived through the Great Depression would not become as terrified by a financial crisis. People who had lived through the horrors of WW II would not be as terrified by a single terrorist act that killed 3,000 people, about 8% of the number of people killed each year in traffic accidents.

But once that final generational change takes place, you're dealing with a population that, once again, is capable of being viscerally frightened and anxious, with a desire for revenge.

So when we look for the causes of a crisis war, what we're looking for are not the political causes, but the visceral causes: What is it that's making the population so frightened and anxious that they're willing to consider genocidal war to resolve the problem.

The Causes of the American Civil War

The whole subject of the causes of war led to a very vigorous online discussion of the specific causes of the American Civil War.

The cause of the American Civil War is commonly given as "slavery."

Sometimes this cause is expanded by saying that "the cause of the Civil War was to abolish slavery." This is silly, of course, since it was the South, not the North, that started the war.

My problem is that I can't figure out how you go from slavery to the civil war. Consider the following:

- President Lincoln had no intention of trying to end slavery any time soon. It turns out he had a plan for the Federal government to provide monetary compensation to the Southern states for ending slavery within

30 years. But that can't possibly be the reason why the South started the Civil War; that would be like someone starting a war today because of something that might (or might not) happen in 2030. It just doesn't make sense.

- Even if President Lincoln had wanted to end slavery immediately, there is no way he could have done so, because of opposition from the South. The only reason that slavery was abolished was because the Southern states were no longer represented in Congress.
- Even if the political blocks to ending slavery immediately could be overcome, everyone knew that the economic result would be disastrous – not only because of the disruption of the Southern cotton industry, but also because of the hardship on the slaves themselves. It's one thing to talk about freeing a young slave, someone who could still get an education, could still travel anywhere, could still take a job and do OK with little pay. It's quite something else to free an elder slave, someone in his or her 50s and 60s, someone who could no longer develop the skills necessary to earn a living. Lincoln was aware of this, and that's one the reasons why his plan to end slavery would have taken 30 years – it involved compensation to Southern cotton growers, and provisions for avoiding hardship to elder slaves.
- “Slavery” is a perfectly plausible cause of war, and indeed many wars have been fought over such a cause – but in those cases it was the slaves who rose up against their masters. Nothing like that appears to have happened in the Civil War.
- No matter how much the South disliked Lincoln, the South had a perfectly good alternative to war if politics was the only issue: They simply had to wait until the 1864 election, and try to elect someone more to their liking than Lincoln. In fact, the President had been a Southerner for 48 of the first 60 years of the Republic, and so it was reasonable to believe that a Southerner could be elected in 1864 or 1868.
- Another problem with identifying slavery as the cause of the Civil War is that it's a “North-centric” view. Since the South initiated the Civil War, we should at least ask the Southerners what they thought the cause of the war was, and they would answer quite differently. According to South Carolina's 1860 “Declaration of the Causes of Secession,” the causes had to do with the North's violations of its commitments and obligations under the Constitution with regard to a whole litany of issues, not just slavery. (See further discussion below.)

So, it seems possible to list slavery as “a” cause of the Civil War, but the claim that slavery is “the” cause of the Civil War, or even “the most important” cause of the Civil War cannot be easily supported.

When I look for the cause of a crisis war, I look for something deeper. I want to know the visceral reason why someone decided to pick up a gun or caused someone else to pick up a gun in order to kill someone else.

In looking for the cause of a war, especially a crisis war, I look for “visceral fear and fury”: Fear over threats to one's life, threats to one's way of life, threats to the existence of one's nation or identity group, and fury at those who are blamed for those threats.

It's only this kind of “visceral fear and fury” that can lead to a crisis war.

To this end, I originally believed that the Panic of 1857 had to be the “real” cause of the Civil War, and I said so in my previous book. The plausible explanation was that the South blamed the North for the economic difficulties, and the North blamed the South for having the economic advantage of slavery.

The Panic of 1857 caused thousands of businesses to go bankrupt; the effects were international in scope (like the 1930s depression), and the unemployment rate in parts of New York City went as high as 90%. The problem was that I can't find any real historical evidence supporting the view that it caused the Civil War.

Tolstoy on the causes of war

Tolstoy wrote *War and Peace* in the same time frame as the Civil War. In describing the “causes” of Napoleon's war against Russia, he was obviously stumped. Here's what he wrote:

It naturally seemed to Napoleon that the war was caused by England's intrigues (as in fact he said on the island of St. Helena). It naturally seemed to members of the English Parliament that the cause of the war was Napoleon's ambition; to the Duke of Oldenburg, that the cause of the war was the violence done to him; to businessmen that the cause of the war was the Continental System which was ruining Europe; to the generals and old soldiers that the chief reason for the war was the necessity of giving them employment; to the legitimists of that day that it was the need of re-establishing *les bons principes*, and to the diplomatists of that time that it all resulted from the fact that the alliance between Russia and Austria in 1809 had not been sufficiently well concealed from Napoleon, and from the awkward wording of Memorandum No. 178.

It is natural that these and a countless and infinite quantity of other reasons, the number depending on the endless diversity of points of view, presented themselves to the men of that day; but to us, to posterity who view the thing that happened in all its magnitude and perceive its plain and terrible meaning, these causes seem insufficient.

To us it is incomprehensible that millions of Christian men killed and tortured each other either because Napoleon was ambitious or Alexander was firm, or because England's policy was astute or the Duke of Oldenburg wronged. We cannot grasp what connection such circumstances have with the actual fact of slaughter and violence: why because the Duke was wronged, thousands of men from the other side of Europe killed and ruined the people of Smolensk and Moscow and were killed by them.

I have exactly the same problem when faced with descriptions of slavery as the cause of the Civil War. To paraphrase Tolstoy, "We cannot grasp what connection slavery has with the actual fact of slaughter and violence: why because Lincoln was elected, hundreds thousands of American men from the North and South killed and ruined the people of Gettysburg and Atlanta and were killed by them."

The Southern causes for the Civil War

Tolstoy reminds us that if we're going to ascribe a political reason to the cause of war, then we're going to end up with multiple causes, since different groups have different political views. One thing that I find really objectionable about saying that slavery was "the cause" of the Civil War is that it's a North-centric point of view. The North won the war, so naturally they get to say what caused the war, but that might simply be a pretext.

This is a very important part of the Generational Dynamics methodology. In order to distinguish crisis from non-crisis wars, then you MUST look at the war from the point of view of each of the belligerents.

One thing that Generational Dynamics makes clear is that a war is very personal, especially a crisis war. If A and B have a war, historians may describe the war, and may discuss the "causes" of the war, but from the point of view of A and B, there are always two completely different wars. It's like a married couple having an argument over money or sex or anything else. The man and the woman may be having two completely different arguments without even realizing it.

The same is true of a war, especially a crisis war. From the point of view of an outsider, the belligerents may be fighting "a war," but from the point of view of the insiders, they're fighting two completely different wars, possibly without even realizing it.

So if we're trying to identify the causes of the American Civil War, at the very least you have to ask the South what THEY think are the causes.

It's true that slavery was a big part of the South's issues, as shown by the 1860 South Carolina Declaration of Causes of Secession:

We affirm that these ends for which this Government was instituted have been defeated, and the Government itself has been made destructive of them by the action of the non-slaveholding States. Those States have assumed the right of deciding upon the propriety of our domestic institutions; and have denied the rights of property established in fifteen of the States and recognized by the Constitution; they have denounced as sinful the institution of slavery; they have permitted the open establishment among them of societies, whose avowed object is to disturb the peace and to eloign the property of the citizens of other States. They have encouraged and assisted thousands of our slaves to leave their homes; and those who remain, have been incited by emissaries, books and pictures to servile insurrection.

So slavery was an issue for the South, as we already knew, but this paragraph makes it clear that slavery was a “cause” in a completely different sense for the South than it was for the North.

It's worth pointing out here that Southerners believed that the North came to the table with unclean hands anyway. They pointed out that the factory economy of the North was more cruel in many ways than slavery – unemployed people could starve and elderly people had no one to care for them. This was contrasted, as we pointed out with respect to Lincoln's proposal to end slavery in 30 years, to the fact that even elderly slaves in the south still had a home and people to take care of them. So the Southerners argued that, however bad slavery was, the Northern factory life was worse.

I'm going into detail on this because in *Generational Dynamics* it's very important to look at wars and their causes from both points of view. In particular, since it's the South that started the Civil War, it's impossible to discern the “cause” of the Civil War without understanding the Southern viewpoint.

Violation of Constitutional Commitments

With regard to slavery, South Carolina's argument was that the North was violating the commitments which led the Constitution to be adopted. But South Carolina had long considered the North to be violating that same Constitution in other areas.

In fact, South Carolina had threatened to secede before. The South was furious over tariff acts passed in 1828 and 1832, claiming that these tariffs harmed the South but poured money into the North to pay for their factories. John C. Calhoun of South Carolina wrote a long series of essays advocating a policy of “Nullification” of the tariff laws, on the grounds that they violated the Constitution, and showing how the South could secede from the Union if the North denied the Nullification policy. Although the Nullification crisis and the secession

threat was contained at that time, it was Calhoun's ideas on tariffs that were used 30 years later for an entirely different issue - slavery.

The Southern resentment over economic issues ran very, very deep, as shown by a speech that Representative John Reagan of Texas gave on the floor of the House of Representatives on January 15, 1861. In speaking to Northern leaders in general, he said:

“You are not content with the vast millions of tribute we pay you annually under the operation of our revenue laws, our navigation laws, your fishing bounties, and by making your people our manufacturers, our merchants, our shippers. You are not satisfied with the vast tribute we pay to build up your great cities, your railroads, and your canals. You are not satisfied with the millions of tribute we have been paying you on account of the balance of exchange, which you hold against us. You are not satisfied that we of the South are almost reduced to the condition of overseers of northern capitalists. You are not satisfied with all this; but you must wage a relentless crusade against our rights and institutions. . .

“We do not intend that you shall reduce us to such a condition. But I can tell you what your folly and injustice will compel us to do. It will compel us to be free from your domination, and more self-reliant than we have been. It will compel us to assert and maintain our separate independence. It will compel us to manufacture for ourselves, to build up our own commerce, our own great cities, our own railroad and canals; and to use the tribute money we now pay you for these things for the support of a government which will be friendly to all our interests, hostile to none of them.”

Finding a visceral spark

My point in going into all the above is to show that to say slavery is the “cause” of the Civil War doesn't make sense. There is simply no way to go from “slavery” to the massive slaughter that occurred in the Civil War.

It's worthwhile now to repeat a portion of the quote from Tolstoy's *War and Peace* that appeared above: “To us it is incomprehensible that millions of Christian men killed and tortured each other either because Napoleon was ambitious or Alexander was firm, or because England's policy was astute or the Duke of Oldenburg wronged. We cannot grasp what connection such circumstances have with the actual fact of slaughter and violence: why because the Duke was wronged, thousands of men from the other side of Europe killed and ruined the people of Smolensk and Moscow and were killed by them.”

Tolstoy wrote those words in the 1860s, and he may have also been wondering exactly the same thing about the American Civil War, since he was certainly aware of it. He might also have felt that it was incomprehensible that a problem like slavery could only be solved by massive slaughter and violence, when there were political solutions available.

We are proposing to answer that question in the following way:

- For a non-crisis war, the “cause” of the war is simple politics, and by “simple” I mean only that visceral, genocidal hatreds are not involved, even if the political goals themselves are complex.
- For a crisis war, there are political goals, specified by politicians, but the vast energy behind the war comes from visceral genocidal hatreds on the part of the large masses of people.

So, for a crisis war, we have to look for a visceral cause that goes beyond the pure political goals. This is the only way to answer Tolstoy's question.

Slave insurrections

The generational paradigm specifies that once the final generational change occurs, and the people in the previous cycle's Artist generation disappear (retire or die), then the people left behind, who had no personal experience with the last crisis war, are highly likely to feel insecure and vengeful when a threat arises.

What we have to do is find something that will cause people to want to pick up a gun and kill people. We're not looking for a abstract political cause, but something so pressing and immediate that a man will want to pick up a gun and kill people to protect his family.

In the case of the Civil War, there are several possibilities why Southerners might have felt that the kind insecurity and vengefulness that was necessary to motivate them to initiate the Civil War:

- They might have been suffering from a financial crisis stemming from the Panic of 1857.
- They might have had an unrealistic fear that Lincoln would somehow end slavery immediately, and throw their cotton businesses into chaos.

Both of these reasons are financial and they're plausible. In the case of the French Revolution, a financial crisis caused the Reign of Terror, in which anyone formerly associated in any possible way with an aristocrat was put to death by guillotine. In America, the Enron scandal in 2001 caused the people to want to see every corporate CEO, whether guilty or not, jailed (if not guillotined).

In the case of the Civil War, there's a much more plausible explanation than a financial crisis.

The key to the dilemma can be found in a sentence of the South Carolina Declaration of Causes of Secession quoted above:

They have encouraged and assisted thousands of our slaves to leave their homes; and those who remain, have been incited by emissaries, books and pictures to servile insurrection.

Slave rebellions had been a concern almost from the beginning of the Republic, as the result of a massive 1791 slave rebellion in Santo Domingo that resulted in some 60,000 deaths.

America's first major slave insurrection occurred in 1800 when an army of 1,000 slaves, led by slave Gabriel Prosser, gathered with a plan to assault Richmond. The plan was thwarted by a black informer, and Prosser and 34 of his followers were hanged.

The pace of slave rebellions picked up in the 1820s, but the best-known is Nat Turner's rebellion of 1831. Here's a description:

On 22 August, Turner and about 70 recruits began a two-day rampage. They killed Turner's master and about 70 others. Some decapitated children (some of the slaves might have been drunk); Turner himself killed only one white. Many blacks chose not to join Turner because they sensed the futility of his effort. Indeed, the revolt was soon crushed. Turner managed to escape and hid out in the woods for 30 days before being caught. In the search to find him, 100 Virginia slaves were slaughtered. Turner was hanged. His uprising had been the most serious in the country to date. It so shook Southern states that they passed more stringent laws related to slaves, increased censorship against abolition, and made military preparations to halt further uprisings. ["The Almanac of American History p. 225"]

Here we see that the problem - slave insurrection - was handled by containment and compromise, as in all generational awakening and unraveling periods. The slaves were punished, and new laws were passed.

By the 1850s, the generational change into a crisis period was occurring. The people who had grown up during the violent Revolutionary War (the "Artist" generation) were retired or gone, and a slave insurrection produced much more anxiety. This is similar to America today: The numerous terrorist attacks, including the massive 1993 World Trade Center bombing, had little effect on Americans, but the 2001 attack traumatized the entire country.

The slave insurrection incited by John Brown in 1859 affected Americans of that day just as the 9/11 attack affected us. Here's the description:

With support from leading abolitionists, [John] Brown then conceived of a plan for establishing a stronghold in the Appalachian Mountains where escaped slaves and freed blacks could take refuge and then lead an armed uprising throughout the South. He rented a farm near Harper's

Ferry, Virginia, and from this base he launched an attack with 21 men on October 16, 1859. He seized the town and the U.S. Armory there, but the local militia kept them under siege until a troop of U.S. Marines, led by Robert E. Lee, assaulted the engine house where Brown and his followers were making their last stand. Ten of them were killed, and the wounded Brown was captured. Tried and convicted of treason, Brown was hanged in Charlestown on December 2. If his raid failed, Brown's eloquent defense during the trial convinced many Northerners that the abolition of slavery was a noble cause that required drastic, possibly violent action. His last prediction that "much bloodshed" would follow proved to be right. Although his violent tactics were not approved by many (and were discreetly disowned by the prominent abolitionists who had encouraged him), Brown became something of a martyr. He inspired the words to a marching song that was the unofficial anthem of the Union troops, "John Brown's Body lies A'mouldering in the Grave." ["The Almanac of American History p. 275"]

Americans of the day were traumatized by this terrorist act, and Southerners particularly were terrified by the insurrections and infuriated at the Northerners, whom they blamed for inciting the insurrections.

The following account in *Lincoln's Emancipation Proclamation, The end of slavery in America*, by Allen C. Guelzo, Simon & Schuster, 2004, pp. 16-17, describes the situation:

Behind the slaveowners' rage at Lincoln lurked the dread not only that Lincoln meant emancipation but that emancipation meant insurrection and race war on the model of the Nat Turner slave revolt in 1831 or the massacres of white planters by their former slaves in San Domingue in 1791. Lincoln's election followed by little more than a year the attempt of the conscience tortured abolitionist, John Brown, to begin a slave uprising by seizing the weapons stored at the federal arsenal at Harpers Ferry, Virginia. No matter that the raid failed, that Brown was swiftly tried and hanged, or that Lincoln publicly condemned Brown. "When abolition comes by decree of the North," predicted Georgia supreme court justice Henry L Benning, "very soon a war between the whites and the blacks will spontaneously break out everywhere." The kind of apocalypse Benning prophesied touched every racial and sexual anxiety of the white South. The race war would be fought "in every town, in every village, in every neighborhood, in every road." The North would take advantage of this turmoil to intervene in favor of the blacks, and the result would be the extermination or exile of the whites—"so far as the men are concerned, and as for the women, they will call upon the mountains to fall upon them." One planter in Maury County, Tennessee, convinced himself in February 1861 that "a servile rebellion is more to be feared now than [it]

was in the days of the Revolution against the mother country," when the British recruited and armed runaway slaves to fight their former American masters in South Carolina. Henry William Ravenal was surprised to find so "much alarm among the people of servile insurrection" and wrote for the *Charleston Mercury* on "the necessity of vigilance on the part of our people against the secret plottings & machinations of the fanatic abolitionists, who will surely come among us in friendly guise to tamper with our negroes." In Texas, fires in Dallas, Denton, and Pilot Point sent fearful whites in pursuit of slave rebels who planned "to burn the houses and kill as many of the women and children as they could while the men were gone." Within a month, as many as fifty blacks and whites had been executed by home guards and vigilante mobs.

Finally we have it. We see the sense in which slavery was the "cause" of the Civil War. We finally see the visceral link that led Southerners from the election of Lincoln to picking up a gun to get ready to start killing.

What about the economic factors? Yes, they must still be part of the fabric of the war. The Panic of 1857 devastated the North, and the Federal taxes and tariffs were doing enormous damage to the economy of the South.

A financial crisis can be thought of as dry underbrush that feeds a war. If the North and South had been wealthy, there would have been far less energy for a war, even in the face of servile insurrection. Men who have no way to feed their families except by joining the army will do so, and energetically if the war is a crisis war.

Conclusion: The causes of the Civil War

So I've come to agree that slavery was "the cause" of the Civil War, but not slavery in the political sense. It was slavery in the form of a visceral fear and fury of servile insurrection.

This is the answer to the question I asked above, paraphrasing Tolstoy: "We cannot grasp what connection slavery has with the actual fact of slaughter and violence: why because Lincoln was elected, hundreds of thousands of American men from the North and South killed and ruined the people of Gettysburg and Atlanta and were killed by them."

What about other causes — political causes and economic causes? Every war has political causes, but people and nations don't want to admit the visceral and economic causes of war. No country wants to admit, "We went to war because we were afraid," or "We went to war for money." A political cause becomes a pretext for war, and is rarely the real cause.

Life is a zero-sum game

Obviously, servile rebellion is not the most common visceral cause of war. That would be poverty and hunger.

In this section we're going to show genocidal war is part of being human: Because the population grows faster than the food supply.

Life is a zero-sum game in the sense that if one person lives, then some other person must die, since there isn't enough food for both.

Thomas Roberts Malthus

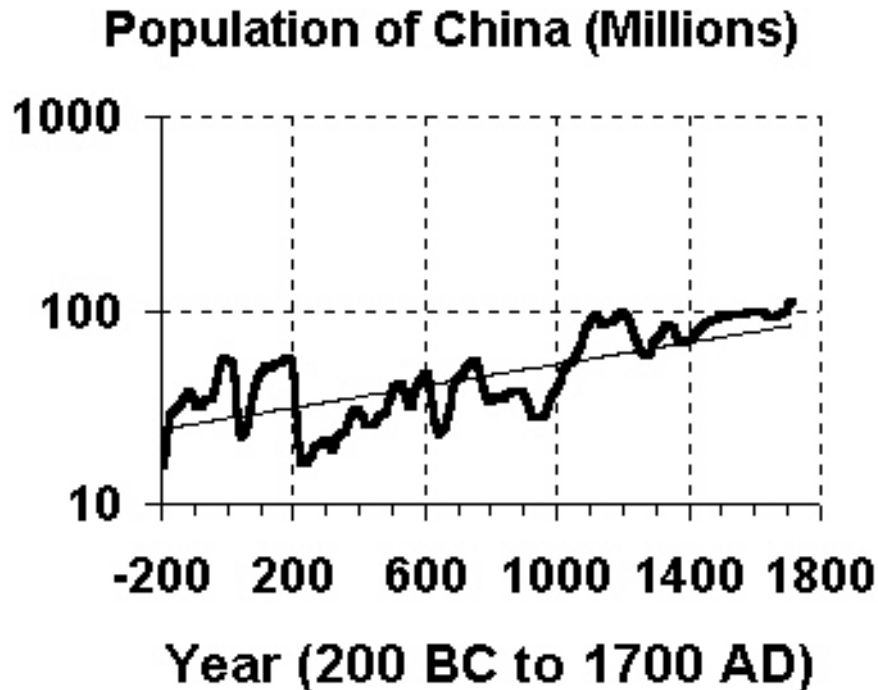
One of the craziest damned things is that everyone says that Malthus was wrong, even though you can pick any day in any year for the last century or more, and there will have been 20-40 wars going on at the time.

In 1798, Thomas Roberts Malthus, published his *Essay on Population* in London, where it was an instant best seller. He showed mathematically that the population grows faster than the food supply, and concluded that there would always be famines killing people.

Now, Malthus made some mistakes. His math wasn't quite right, but it's still true that the population grows faster than the food supply. But his biggest mistake was the conclusion that famines would be the main vehicle that brought the population down.

Nature provides one method – sex – to increase population, and three methods – famine, disease and war – to decrease population. There are occasional famines, and there were massive deaths from the Black Death (Bubonic Plague) in 1347 - 1350. But those are rare examples. War, especially genocidal crisis war, is the most common method.

Sex and crisis war are the Yin and Yang of “survival of the fittest.” The most successful tribes, societies, nations, religious groups or ethnic groups are the ones that can spawn the greatest number of children while exterminating the greatest number of other tribes, societies, nations, religious groups and ethnic groups.



Population of China in millions of people[•] from 200 BC to 1710 AD, shown with logarithmic scale

The adjoining graph of the population of China shows wild ups and downs. The straight line is the best fitting exponential growth trend curve (a straight line when graphed on a logarithmic scale). When the population goes up, we can assume that the Chinese were winning crisis wars against their neighbors, and perhaps enslaving them and taking their food. When the population does down, we can surmise that the Chinese lost a crisis war, or that there were civil wars where they killed each other off.

But why was Malthus wrong about famines and war? Let's now answer that question.

Population versus Food Availability

Malthus' views are rejected by almost everyone because we haven't seen the massive famines that Malthus predicted. Pundits claim that Malthus' predictions have been invalidated by technology in the form of the "Green Revolution," that has produced enough food to keep up with population growth.

The Green Revolution began in 1944* when the Rockefeller Foundation founded an institute to improve the agricultural output of Mexican farms. This produced astounding results, so that Mexico went from having to import half its wheat to self-sufficiency by 1956, and by 1964, to exports of half a million tons of wheat. In the 1960s, the Green Revolution had similarly spectacular results, especially in India.

The problem with the Green Revolution is that it's a one-shot deal. You can move a given country's agriculture to the latest technology only once. After that, they'll have to invent new technologies to obtain further crop yields.

How fast do crop yields grow once a country has already been converted to the latest technology? To answer that question, I wanted to get a kind of "steady state" figure for the rate of increase of food production that would be independent of things like the green revolution. So I went to the USDA statistical service <<#stdurl 'http://www.usda.gov/nass/'"#>> and obtained the "bushels per acre of wheat" from 1866 to 2003. This figure grew from 12.1 to 44.2 during that period, which is an annual growth rate of 0.96% per year. Thus, I've been using 0.96% as a kind of benchmark figure for the growth of food availability each year.

Next, I wanted to get an estimate of the world's annual population growth. To get this estimate, I went to the United Nations database of population information at <#stdurl 'esa.un.org/unpp/index.asp'"#>, and got the following world population table:

Year	Population
1950	2 518 629
1955	2 755 823
1960	3 021 475
1965	3 334 874
1970	3 692 492
1975	4 068 109
1980	4 434 682
1985	4 830 979
1990	5 263 593
1995	5 674 380
2000	6 070 581
2005	6 453 628

This represents an average annual growth rate of 1.72% per year.

In support of this figure, take a look at the CIA Fact Book <#stdurl www.cia.gov/cia/publications/factbook/#> which gives the population growth rate on a country by country basis.

Here are some rate of growth figures for some Western countries:

United States	0.92%
United Kingdom	0.3%
France	0.42%
Germany	0.04%
Israel	1.39%

These figures show that Western countries have a fairly low rate of population growth.

Now look at some Muslim countries:

Syria	2.45%
Saudi Arabia	3.27%
West Bank	3.3%
Gaza Strip	3.89%
Pakistan	2.01%

This shows that the population in Muslim countries has been growing several times faster than Western countries. If you want to understand why we're heading for a "clash of civilizations" world war, then forget all the nonsense about politicals and hurt feelings and saving face and just look at the population growth figures above. They tell the entire story.

Population versus food in China

The problem of food versus population is well shown by the experience of the People's Republic of China since it was formed in 1949.

During the 1950s, Mao Zedong's Communist collectivization program destroyed China's agricultural production, culminating in the Great Leap Forward of 1958-60, and a man-made famine that starved tens of millions of people. Building on that low base, and taking advantage of a Chinese "Green Revolution," China increased agricultural production steadily until the 1990s, despite a reduction in available farmland of 1/3 during that 40 year period, to erosion, construction of buildings and roads, and desertification. [[<http://publish.gio.gov.tw/FCJ/past/04122471.html>]]

Since 1998, grain production has fallen from 510 million tons to just over 400 million tons in 2004. This has required massive and increasing imports of grain into China.

The following table gives all the relevant figures, including the rates of growth for 11 years versus rate of growth for the last five years:

China: Production of Wheat and Coarse Grains, 1993-2005

	Popu	Land	Produc	Total	Ending	
	lation	Area	tion	Imports	Consumed	Stocks
		Yield				
1993/94	56.0	4.0	223.6	5.6	214.0	149.5
1994/95	1.219	55.1	3.9	213.6	16.6	219.8
1995/96	56.2	4.0	226.7	15.5	221.9	177.6
1996/97	58.7	4.3	251.9	4.8	228.6	200.7
1997/98	58.1	4.1	238.0	3.5	230.6	204.2
1998/99	58.8	4.3	253.2	3.4	235.6	221.3
1999/00	1.275	58.4	4.3	251.1	3.4	238.1
2000/01	53.1	4.0	213.6	2.6	240.7	194.7
2001/02	52.1	4.1	216.1	3.1	241.6	162.1
2002/03	51.9	4.3	221.0	2.2	241.6	126.7
2003/04	49.3	4.3	211.1	5.3	244.6	88.1
2004/05	1.322	49.3	4.6	225.4	10.0	246.0
Rate	0.81%	-1.1%	1.3%	0.073%	1.3%	-6.4%
5 yr Rate	0.73%	-3.3%	1.4%	-2.136%	0.65%	-20.5%

Units:

Population: Billions of people

Land Area: Millions of hectares of land (1 hectare = 2.47 acres)

Yield: Tons of grain per hectare

All other fields: Millions of tons of grain

File: hist_tbl.xls from:

<http://www.fas.usda.gov/grain/circular/2005/02-05/graintoc.htm>

http://www.fas.usda.gov/grain/circular/2005/02-05/hist_tbl.xls

Population: <http://esa.un.org/unpp/index.asp>

Note the following points about the above table:

- The yield has been increasing by 1.3%-1.4% per year. This is quite a bit faster than the 0.96% rate in America, because of China's "Green Revolution" in the last 40 years.
- However, yield increases have been increasingly more than wiped out by land area decreases, at the rate of -3.3% per year since 2000. This reflects China's increasingly rapid industrialization, which has used up more and more farmland for buildings.
- Food production has been falling dramatically, by -2.14% annually since 2000, which is when food production peaked.
- Meanwhile, population growth has been slowing slightly, at 0.81% over the entire period, but just 0.73% per year over the last five years.
- Putting these figures together tells us that the amount of food production *per person* has been decreasing by -2.9% per year. That means that each family has about 3% less food today than it did a year ago today.
- To fill the gap, China has been drawing down its wheat stocks, at the alarming rate of -20.5% per year since 2000. Furthermore, imports have suddenly skyrocketed in the last year.

These figures are important to all of us because food prices have increased 30% (**thirty percent!!**) worldwide in 2004.

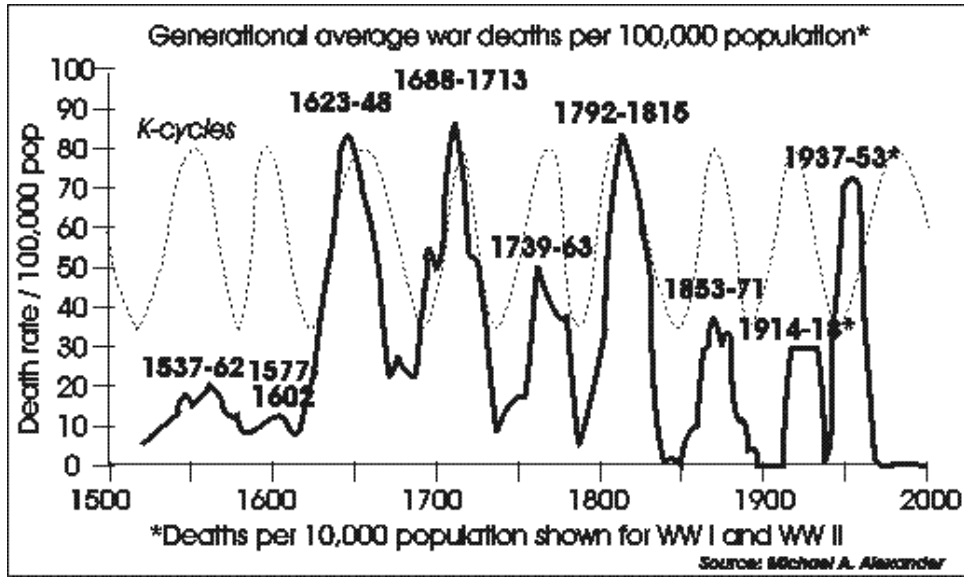
This has had a tremendous impact on poor populations around the world, especially in Muslim countries. Why especially in Muslim countries? Because those are the countries where population has been growing the fastest, at 2-4% per year. These food price increases are hitting Muslim countries especially hard.

As for China itself, we can see it unraveling before our eyes. Day-to-day events, including regional rebellions, secessionist provinces, migrant workers, high food prices, high rust belt unemployment, addiction to a bubble economy, and unraveling of Mao's social structure, portray a country that's headed for a civil war. We can't predict exactly when this will occur, but the table shown above indicates a country that's unraveling faster and faster, so we expect a crisis civil war in China to begin sooner, rather than later.

War deaths in World Wars I and II

The number of war deaths exploded in the 20th century. In this section, we'll explain that this is happening because of advances in medicine, especially in reducing child mortality.

The following graph shows the patterns of war deaths[♦] for the last few centuries.[♦] (We'll see this graph again on page 131, when we talk about Kondratiev cycles.)



War deaths correlated to Kondratiev Cycles (Source: Mike Alexander)

Notice the footnote in the above diagram, indicating that the death rates for the two World Wars should be *ten times as high* as shown on the graph.

Reading the figures from the graph, we can see that the death rate per 100,000 population at the major peaks is:

1623-1648 (Thirty Years War)	80
1688-1713 (War of the Spanish Succession)	80
1792-1815 (Napoleonic Wars)	80
1914-1918 (World War I)	300
1937-1953 (World War II)	700

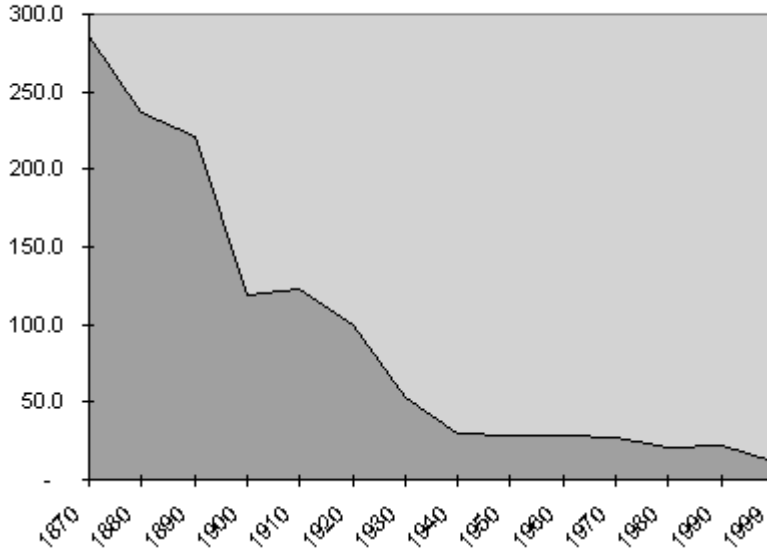


1918 cartoon on reducing infant mortality

So the peak death rates were fairly constant for several centuries, and then suddenly spurted up by a factor of ten in the 20th century. How could that possibly have happened? Almost every growth quantity in nature grows exponentially, so something like this requires an explanation.

The adjacent cartoon, from the www.chipublic.org/004chicago/disasters/infant_mortality.html "Chicago Public Library" web site, should give you a clue. It appeared around 1918 and it bemoans the fact that 20% of babies die prior to their second birthday, almost always from a preventable disease.

Estimated Chicago Infant Mortality Rates: 1870 to 1999
(Deaths under 1 year of age per 1000 live births)



Estimated infant mortality rates - 1870-1999 - in Chicago

This graph shows dramatically how infant mortality has decreased, from 73% survival in 1870 to 88% survival in 1910 to 99% survival in 1999.

The result of this drastic reduction in infant mortality is a "youth bulge" – a much larger percentage of the population is younger.

Let's compare the Napoleonic wars (1700-1714) to WW I (1914-18). Napoleon mobilized two million men, but in WW I, the Allies mobilized 40 million men and the Central Powers mobilized more than 25 million men.

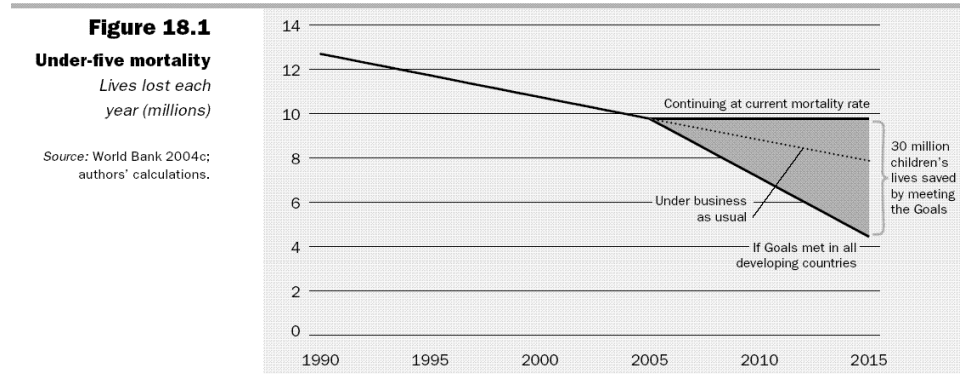
Now, granted that the two regions we're discussing aren't identical, but the difference of 2 million to 65 million is quite remarkable. The population would have grown by a factor of about 4 between those two wars, but the number of soldiers mobilized for war increased thirty-fold. How is that possible?

That's possible because of the youth bulge. The infant mortality rate was probably around 50% at the time of Napoleon, and was 12% at the time of WW I.

The population increased by a factor of 4, but the population of war-age males was many times larger.

(This example requires some additional analysis - to tie it into the population vs food supply paradigm.)

Infant mortality continues to decrease, as the following graph from a U.N. report shows:



Under-five mortality, 1990-2015. Source: United Nations

The advances in medicine in the last two centuries have been amazing, but they've had the effect of reducing the number of people who die from disease. That's good, I suppose, but it means that a lot more people have to die from war, because there's only so much food. And, in particular, the decrease in youth mortality has exacerbated this problem, by making a larger percentage of the population young males.

The population of the world today is about 6.5 billion. But if you extrapolate from 1950 to get the population today that would be supported by the amount of food today to get the same amount of food per person as in 1950, then you get about 3.8 billion.

That means that the coming "clash of civilizations" world war should be expected to result in billions of war deaths. The fact that so few people have died from disease means that so many, many more people have to die in war.

The Malthus Effect

As we've said, people who say that Malthus was wrong are nuts. His basic finding that population grows faster than the food supply was absolutely correct. Malthus may have gotten some of the details wrong, especially his prediction that the result would be famines, but the basics were right.

Many people don't understand what effect the Malthus problem has on society. Most people think, "As long as there isn't a famine, the Malthus problem hasn't yet been realized."

The result is actually war, not famine. The actual process that occurs instead of famines is tied into the generational cycle. I call this process the "Malthus effect."

The Malthus effect applies to every nation, every society, at all times.

After a genocidal crisis war, there's plenty of food for everyone, since the population has been reduced. In the decades that follow, the population grows faster than the food supply.

Since population grows faster than the food supply, on both a regional and worldwide basis, it means that food becomes increasingly scarce, even though the total food production is increasing. And since food becomes increasingly scarce, the cost of food steadily increases.

So, for example, if a bowl of rice costs one hour's wages in 2000, then it might cost two hours' wages in 2001, and three hours' wages in 2002. Each year, the cost of food increases, meaning that people have less to spend on clothing, shelter, and other things.

Thus, the Malthus effect affects not only food, but an entire lifestyle. As the cost of food increases, year after year, a population becomes poorer and poorer, because they have less money to spend on other things besides food.

So the Malthus problem is not some far off problem that will cause a famine decades from now; it's actually a problem that occurs every single day, as the cost of food increases every day.

This problem becomes acute in regions where there are "market-dominant minorities." This phrase refers to places where there is a large population in poverty living in the midst of a minority, usually of a different race or religion, that controls most of the wealth.

Here are some examples:

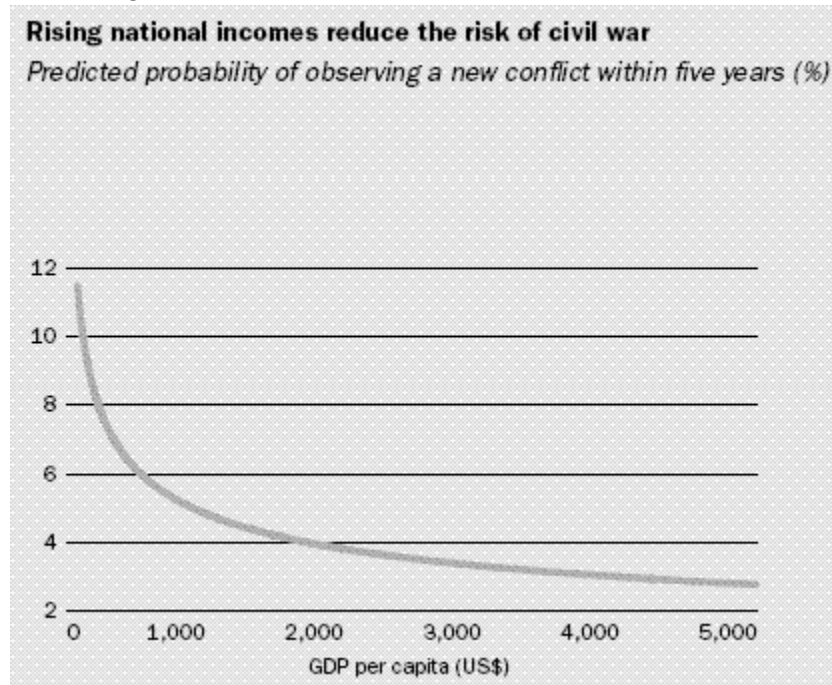
- In Haiti, the population is mostly Creole-speaking blacks, mostly living in poverty. The market-dominant minority is the French-speaking light-skinned mulattos, who control most of the country's wealth. Haiti appears to be heading toward civil war, across the fault line separating the blacks and mulattos.



Poor neighborhood in Haiti

Incidentally, this example illustrates the problem of food distribution. Ever since the US intervened in Haiti in 1994, the US has sent billions of dollars of aid to Haiti, and yet the population is poorer than ever. The country's leaders have simply dissipated the aid for their own purposes.

- In Rwanda, the poor Hutu majority population committed massive genocide against the wealthy, minority Tutsi population in 1994.
- In the Philippines, the small Chinese minority controls most of the wealth, while the large population of poor Filipinos either starve or search through garbage dumps for food.
- In the Israel/Palestine region today, the Jews are substantially wealthier than the Palestinian majority. However, America provides a great deal of foreign aid to the Palestinians, and this offsets the threat of war.



Income versus probability of war (Source: UN)

The relation between money and civil war is shown by the above graph, from a recent United Nations report[♦]. This graph shows the relationship between a country's average GDP and the risk of civil war.

The purpose of the UN report was, of course, to motivate the United States and other wealthy countries to find a solution to worldwide poverty. Since that goal is mathematically impossible to meet, for us the above graph is further proof that the world is headed to world war.

Severe poverty can, of course, occur at any phase of the generational cycle, though it's obviously more likely in the Awakening and Unraveling periods than in the Austerity period.

A wealthy minority is never as evil as the political opposition claims. In the Austerity period following a genocidal crisis war, all political groups and generations unite in their determination that nothing so horrible should ever happen again. Thus, there are always plans to make sure that everyone has adequate food and shelter, and that's always much easier than before the war because of the reduced population.

This is especially true in colonization situations. The colonial powers of the 1800s believed that colonization was a win-win situation: the colonial powers would bring investments and factories and agricultural techniques and medicine to the colonized people. These people would then have jobs to manufacture goods for export, which would earn them money so that they could be self-sustaining. It's a perfect solution, especially after the colonial region has just had a crisis war, and needs the "guidance" of the more experienced colonial power.

But it goes wrong because the population grows faster than the food supply, creating poverty. You start having patches of poverty during the Awakening period, and increasingly into the Unraveling period, often causing rioting or low-level violence that's handled by police actions.

If the low-level violence gets bad enough, then a political solution is sought, usually by giving the impoverished majority greater control over the political process. A typical solution is to arrange for the President of the country to be someone from the poor majority.

Unfortunately, there's never a political solution to a mathematical imbalance. The population continues to grow faster than the food supply, so the cost of food continues to increase, and so poverty continues to increase. The problem of helping the poor becomes overwhelming. The people in the wealthy minority develop a "bunker mentality," and keep more and more to themselves.

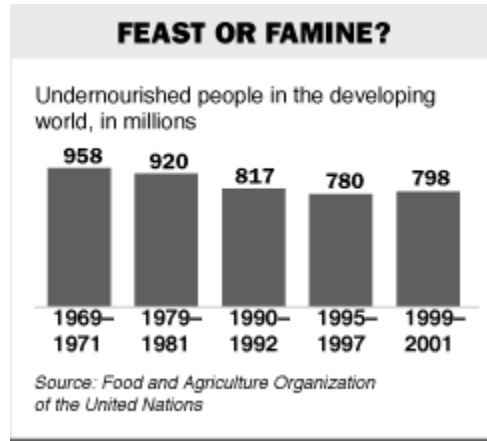
It's difficult, though not impossible, for people in the poor majority to break through and gain wealth or political power. If someone from the minority *does* break through, then he'll soon join the bunker occupied by the wealthy minority. This translates into bribery, corruption, fraud, and other techniques. The people involved are not necessary evil people (though they may be); it's just that the poverty problem is mathematically insoluble.

Today we're seeing this right before our eyes. In the analysis of China in the previous sections, we can see that China is depending on its bubble economy to suck up as much food as possible, to feed its huge unemployed and migrant population. This depends on exports to America, which depend on purchase of American debt. The situation is becoming worse and worse, and it will take only a moderate perturbation to send the entire system out of control.

At least China has a relatively low population growth rate. But not so the Muslim countries, whose population is growing at the rate of 2-4% (or more!) per year. The price of food increased by 30% in 2004, and this has hit the poor Muslim communities especially hard.

We're at a unique time in history, about 60 years after the end of World War II, when every country is experiencing the same generational change at the same time: The people in the generation that lived through WW II are all disappearing (retiring or dying) all at once, and are being replaced by the people in the generation born after WW II. Furthermore, the entire world's population is growing faster than the entire world's food supply.

There have been few crisis wars in recent decades. There was Cambodia in the 1970s, Iran/Iraq in the 1980s, the former Yugoslavia in the 1990s, and a few other smaller ones. Unfortunately, this is bad news, because it means that the population has been growing way too rapidly. Generational Dynamics gives a very clear picture, on a country by country basis, where each country is going. For most countries, conditions are increasingly right for participation in a "clash of civilizations" world war.



Undernourished people in world over time. Source: WSJ

Moral and Immoral Wars

The findings of Generational Dynamics are that every tribe, society, and nation goes through the same genocidal crisis war cycle. There is no known difference between democracies and dictatorships, republicanism and fascism, fiefdoms and monarchies, presidential systems and parliamentary systems, small tribes and international superpowers.

What then are the criteria for moral genocidal wars? For the most part, this is a political judgment, and so is beyond the scope of this book.

So we restrict ourselves here to simply listing some of the issues.

International law tells us that genocide is a war crime. And yet, Generational Dynamics tells us that every nation becomes genocidal during crisis wars. In fact, the growth of population faster than the food supply makes genocidal wars a requirement for survival.

In criminal law, there are various categories of guilt when one person kills another. There's "murder one," when you can prove premeditation, motive and opportunity. There's "self-defense," when it's kill or be killed. And there are other categories – murder two, manslaughter, etc. – in between those two extremes.

Well, can't any act of genocide be considered self-defense? Since there's not enough food for everyone, then it's only right for people of my nation, my race, my religion, my skin color or my ethnicity to try to exterminate people of other nations, races, religions, skin colors and ethnicities, since there's only enough food for us or them, but not both.

America actually has good legal defenses for almost all its wars. General Sherman's scorched earth march through Georgia in 1864 was justified because the South started the Civil War. The same reasoning applies to the genocidal firebombing of cities in World War II, and the use of nuclear weapons.

But is that enough of a legal defense to genocide? Is genocide more moral if the other side starts the war? How much genocide does the other side have to commit before you're allowed to commit genocide and still be moral?

Conversely, now that Generational Dynamics tells us that we're going to be entering a new genocidal world war, we can anticipate that our enemy is going to try to exterminate us. (Indeed, Islamist extremists have said they would try.) Doesn't that give us license to be genocidal even before the other side is?

Those are political problems, but the religious problems are even knottier.

According to beliefs in most religions, wars are the fault of human beings, and are certainly not God's fault.

But now we've shown that wars are caused by generational cycles and by the fact that population grows faster than the food supply, and that poverty mathematically **MUST** increase every year, until a crisis war breaks out to bring down the population again.

Now, if God is all-powerful, and God created the earth, it's clear he could have created an earth where the food supply and population grew at the same rate. Instead, he created a world in which the population grows substantially faster than the food supply. That's his fault.

That means that periodic wars are mathematically required. That's also his fault. Therefore, wars are God's fault, not humans' fault.

So if you're religious, then Generational Dynamics tells you that wars are God's fault. If you're not religious, then Generational Dynamics tells you that wars are part of Darwin's "survival of the fittest" paradigm. Either way, it's not human beings that are at fault for war. We're just doing what our DNA is telling us to do.

Problems for review and research

- Choose a historical crisis war of interest to you. Analyze the various causes of the war from the point of view of each of the participants. What was the visceral cause of the war?
- Speak to scholars in your religious faith and ask them why God created a world in which population grows faster than the food supply, so that genocidal wars are mathematically required.
- Given that reducing infant mortality increases war deaths, is reducing infant mortality good or evil?
- What does it mean for a country or region to fight in a crisis war? Did Iceland or Switzerland fight in World War II? Did Kansas fight in WW II? What are the minimum requirements for a country's or region's participation in a crisis war to launch the generational cycle in that country or region?

Chapter 4 - Chaos Theory and Generational Forecasting

This chapter has a dual title because we want to do two things in parallel – develop Chaos Theory as it's applied to Generational Dynamics, and simultaneously develop the nitty-gritty of actual forecasting.

On the theoretical side, we're going to solve the problem of how cycles and patterns work in history, and we'll show what can and cannot be forecast. On the practical side, we'll summarize some of the specific forecasts that we've been making since 2002 on the web site <http://www.GenerationalDynamics.com> .

Doing theoretical and practical development in parallel makes sense because the theoretical development has little value unless it has practical value in making predictions and forecasts, and making predictions and forecasts cannot be considered credible unless they're backed up with a solid theory.

The theoretical and the practical have gone together from the beginning. Since 2002, my web site, www.GenerationalDynamics.com , has been providing hundreds of forecasts and predictions based on Generational Dynamics. Some of these forecasts have been general, and some have been very specific, many have already come true, none has been proven wrong. This web site has produced results which I would have believed impossible three years ago. And this activity went on as the theory came together.

Incidentally, and this is beside the point, but I believe that this is one of the most significant “real life” examples of Chaos Theory around. Most examples in textbooks are abstract models based on mathematical formulas.

An informal discussion of forecasting

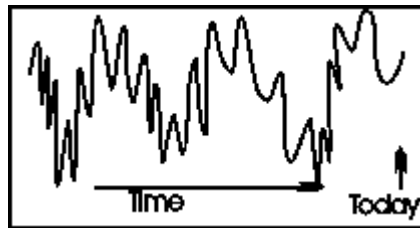
Before getting to the Chaos Theory model, we start with a general description of the different kinds of forecasting. On its own, each of these kinds of forecasting has some value, but most of the power of Generational Dynamics come from combining the different types. With that background, the Chaos Theory model will make a lot more sense.

Description of Short-Term Forecasting

Short-term forecasting is what everybody uses. To use it, you examine recent previous trends and extrapolate them forward from the present time into the future to make a forecast. This usually works well for growth trends, but not for chaotic trends like weather and politics.

Example: During a November heat wave in New York City, the outside temperature increases every day for two straight weeks. You extrapolate forward and forecast that the temperature will continue to increase in December and January. Obviously, this forecast fails.

This example shows why the kind of political forecasting you want to do fails, and why it HAS to fail.



Short-term forecasting

The adjoining graph shows what happens. The value being analyzed shows an increase in the period just before "Today." In short-term forecasting, we extrapolate this increase forward, and predict that the value will continue to increase.

Description of Long-Term Forecasting

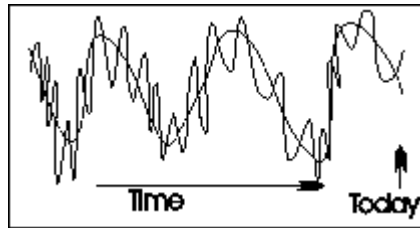
A long-term forecast uses a completely different technique, and one that is rarely used by analysts.

The technique is to examine previous trends far into the past to establish long term cycles and patterns, and extrapolate them into long-term trends in the future. To make short-term forecasts, you match current trends to the long-term trends.

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Example: In the weather forecasting example, you begin by examining temperature records far into the past, and you discover that the weather is cold every 12 months (in winter). So you conclude that the November heat wave is an anomaly, and you forecast that the temperature is going to fall in December, because you've established long-term patterns with winter coming every year.

This shows why long-term forecasting is more accurate in many cases.



Long-term forecasting

The adjoining graph shows what happens. This graph is the same as the preceding one, except that we've added a long-term trend line. Following the long-term trend line allows us to forecast that the value will fall, despite the recent increase.

Example: Based on long-term cyclic trends, Generational Dynamics predicts that there will soon be a major regional war between the Jews and the Arabs in the Mideast. At this writing, in January 2003, the Palestine region appears to be headed for peace. We'll have to wait to see whether the short-term or long-term forecast turns out to be correct.

We're at a unique time in history, about 60 years after the end of World War II, when every country is experiencing the same generational change at the same time: The leaders in government, education, business, labor unions, social organizations and other organizations are people from the generation that lived through WW II (the "Silent Generation"), and they're all disappearing (retiring or dying) all at once, and are being replaced by the people in the generation born after WW II (the "Baby Boomers"). Generational Dynamics gives a very clear picture, on a country by country basis, where each country is going. No standard short-term forecasting technique can produce that result.

Combining Short-Term and Long-Term Forecasting

Short-term and long-term forecasting have very different characteristics:

- Long-term forecasting produces predictions that are highly (near 100%) certain, but with no specified path or time frame, except within a window a decade or two long. That is, long-term forecasting tells you with certainty where you're going, but doesn't tell you how you'll get there, or how long it will take.
- Short-term forecasting produces predictions that are highly uncertain (often no better than chance or 50% probability), but are highly specific as to time.

By carefully combining the two techniques, we arrive at a prediction that's highly specific, with short or medium term timeframe.

The idea is that the long-term forecasting gives you your destination; then short-term forecasting techniques can be “advised” by the long-term predictions to arrive at a probabilistic short-term result.

We're going to discuss this technique at greater length in the next chapter, on financial forecasts. For example, long-term forecasting predicts that there'll be a new 1930s-style Great Depression sometime in the 2000s and 2010s decades. By following short-term forecasts for things like unemployment rates, inflations rates, and so forth, the time frame can be narrowed significantly. The next chapter will explain this in more detail.

Example: Generational Dynamics predicts that there will be a Clash of Civilizations world war in the next few years, probably sooner than later.

The two World Wars, I and II, have not yet been refought. The only questions are: when will the war begin, and who will be fighting against whom?

In 1945, when WW II ended, we could never have predicted with any certainty that we would be heading for a clash between Western and Muslim civilizations.

Today, Generational Dynamics tells us a great deal about how this world war will begin, and how soon. We'll go over this later, in the section entitled, “The six most dangerous regions in the world.”

Exponential growth trend forecasting

My last book discussed exponential growth trends in detail, and so here we only summarize that chapter.

Cyclic trends usually apply to values that remain relatively the same over long periods of time. Any increases or decreases are only temporary.

Growth trends apply to values that grow over long periods of time. In particular, when some value in nature grows, it almost always grows at an exponential growth rate, and so we'll restrict our discussion to exponential growth trends.

- **Population growth.** Generally speaking, for any population of humans or animals, a certain percentage of the population will have offspring each year, and a certain percentage will die. These percentages tend to be roughly the same each year. The result is that the population tends to grow by the same fixed percentage each year, which is the formula for exponential growth.

However, it's a little more complicated: Most populations (including humans) will tend to grow faster than the amount of food available to feed that population. When the population grows to the point where not enough food is available, then a segment of the population is killed – by

famine, by a disease epidemic, or by war. This is the “Malthus Effect” that I discussed in a previous chapter (p. 62).

- **Population-based trends.** Many growth trends are directly related to the size of the population, and exhibit exponential growth simply because the population exhibits exponential growth.

For example, how many shoes are manufactured each year? I don't have the figures, but I assume that it's one or two pairs per person around the world, and that's probably been true for centuries. Thus, the number of shoes manufactured each year grows exponentially because the population grows exponentially.

Here's a crucial fact: If there's a temporary perturbation in the size of the population, it will affect the shoe trend. For example, if a world war or an epidemic temporarily causes a 20% drop in the population, then the number of shoes manufactured annually will probably drop about 20% as well.

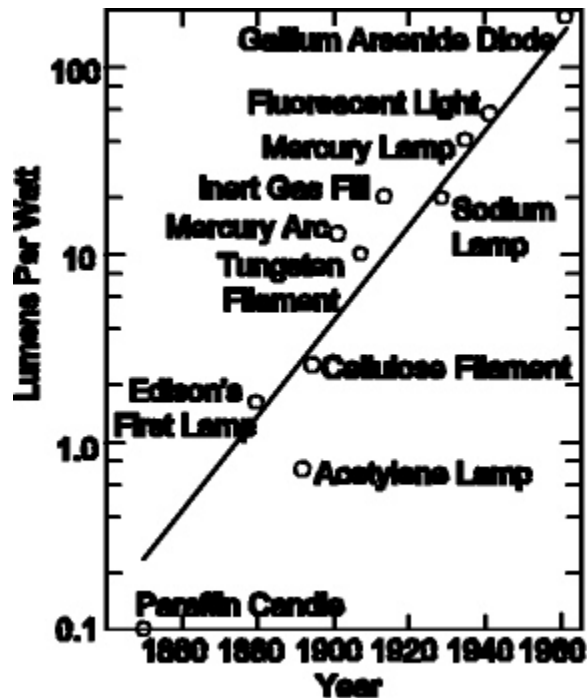
- **Technological growth trends.** This is the most fascinating — and mysterious — kind of exponential growth trend. It's completely independent of population.

An example is the power of calculating machines and computers, which has been growing at an exponential rate for over a century, but with no relationship to the population size.

Technological growth is not affected by perturbations in the size of the population. For example, if a world war or epidemic killed 20% of the population, the power of desktop computers would NOT drop 20%. It would stay the same. So the power of desktop computers is unrelated to population. (We'll discuss the exponential growth of computer power again in chapter xxx, p. 140.)

Actually, it wouldn't stay the same: It would continue growing at exactly the same rate. This is the fascinating thing about technological growth — that it's on a growth path entirely its own, completely independent of population, wars, politics or skirt lengths.

The mysterious thing about technological growth is the steadfastness with which exponential growth trends are maintained for decades or centuries, across wildly varying technologies. We provided numerous examples in my last book, so we'll just give one example here:



This diagram shows how numerous different technologies for artificial light have always been invented at almost exactly the right time*.

Notice in the adjoining graph how new inventions have been improving the efficiency of artificial light sources over time, and how the efficiency has been growing exponentially. Also, notice how each new invention comes at exactly the right time to maintain the steadfast exponential growth.

This graph illustrates how mysterious technological growth is. Why should all these wildly different technologies produce light sources that increase efficiency according to a well-defined predictable growth curve?

Notice also that these technological advances have absolutely nothing to do with population.

- **“Doubly exponential” population trends.** Other growth trends might be described as “doubly exponential,” because they depend on the population and in addition, they grow exponentially *PER PERSON*. For example, if you compute the total amount of energy used throughout the world, you would find that it increases exponentially, and you wouldn't be surprised because the population grows exponentially. But it turns out that the amount of energy used *per person* is also growing exponen-

tially, giving a “doubly exponential” effect, combining population-based and technology-based exponential growth effects.

- **Technology-related growth trends.** There are many social trends that are exponential because they're technology related. For example, the divorce rate grew exponentially from 1850-1990 because technology provided labor-saving devices (washing machines, frozen foods, etc.) that freed women from the kitchen. Many financial values (stock market prices, gross domestic product, etc.) also grow exponentially, as we'll describe in the next chapter.

Summary of Generational Dynamics forecasting techniques

This book discusses a number of very different cyclic and growth trends, along with associated forecasting techniques. Generational Dynamics combines all of these trends and techniques to obtain a predictive model that's far more powerful than any single trend or technique used alone.

Here is a summary of the different trends described in this chapter and in other chapters:

- Generational political trends (long-term, cyclic, local). This is what most of this book is about. Trends are cyclic, with a cycle length of 70-90 years (roughly, the length of a human lifetime). Also, cycles are local to each region, although regions merge over time. In the 20th century, most regions of the world merged into two major timelines, which we refer to as the World War I timeline and World War II timeline.
- Generational financial trends (long-term, cyclic, global). These are cyclic, but unlike generational political trends, these are global. The major trend events have been financial crises that occur every 70 years or so (Tulipomania bubble (1637), South Sea Bubble (1721), French Monarchy bankruptcy (1789), Hamburg Crisis of 1857, and 1929 Wall Street crash). A new financial crash is forecast for the next few years (p. 123).
- Population growth trends (long-term, growth, local and global). The population grows exponentially.
- Technology growth trends (long-term, growth, global). These are exponential growth trends that are independent of technology. The power of computers is an example.
- Kondratiev cycles (long-term, cyclic, global). These 40-50 years cycles were identified in the 1920s, and are discussed in chapter xxx (p. 131).
- Day-to-day political events, daily stock market fluctuations (short-term, chaotic, local or global). These are short-term forecasting techniques.

Generational Dynamics uses all of these together to get a complete picture. In particular, analyzing short term chaotic events can provide information about

how close we are, at any given time, to the final destination predicted by the long-term trends.

Looking ahead to attractors

Later in this chapter we'll discuss Chaos Theory attractors. Let's introduce the concept now with a couple of examples.

Suppose I ask you to predict the temperature in New York City on January 15 of next year. You might guess something like 30 degrees F (-1 degree C). Why? Because you know it will be winter, and you know that the best guess is a colder temperature. Similarly, you might guess 70 degrees F (21 degrees C) for July 15.

In this example, winter is a long-term cyclic trend forecast, and the day-to-day temperature is a chaotic, random value. Even though the day-to-day temperature is chaotic, it's likely to be close to the trend value determined by the season.

In Chaos Theory, the season trend is called an "attractor," and the day-to-day temperatures are "attracted" to the trend values. This is one way of saying that the daily temperatures are permitted to vary, but are more likely to be close to the trend temperature.

Now let's turn this example around the other way. Suppose you've been imprisoned in a closed room in NYC, and you're going to be freed on January 15. Suppose you have no idea what the date is, but each day you're given only one bit of information: Someone tells you the outside temperature at noon. How do you know when you're getting close to liberation day?

Obviously if the outside temperature is hot, then it must be summer, and so liberation day (January 15) must be very far off. As the temperature grows colder and colder, you can estimate how close you're getting to January 15.

In the first example, we used an attractor trend value (the season) to predict a chaotic value (the daily temperature).

In the second example, we used a chaotic value (the daily temperature) to predict where we were within the trend cycle (the attractor).

In the Generational Dynamics forecasting methodology, the chaotic values and attractor values reinforce each other. In other words, if you know it's winter, then you can predict cold temperatures; if the temperatures are cold, then you can predict it's winter.

Earlier, we said that an ordinary political prediction may have no better than a 50-50 chance of coming true. But if it's the right kind of chaotic political event, and it's "attracted" to the current generational era, then we may be able to say that the political prediction has a 70-30 chance of coming true, or even 90-10.

Thus, in 2002 we were locking up Muslims in jail without charges. This was a drastic change of behavior in the American people, and we've seen nothing of the sort since WW II, when we locked up Japanese without charges. This kind of behavioral shift is characteristic of a generational crisis period, and so I was able to "predict" that we were getting deeper and deeper into such a crisis period.

Once this trend value was established, I was able to "predict" other behaviors typical of crisis periods; for example, I predicted that there would be no antiwar movement of any consequence, since an antiwar movement is not characteristic of crisis periods. Sure enough, through the Afghan war, the Iraq war and its aftermath, and even the Presidential election, there was no antiwar movement to speak of, except for an occasional brief spurt.

As a practical matter, this shows how to use Generational Dynamics to make predictions. WW II ended in 1945, meaning that the next crisis war could begin any time between 1990 and 2030. But by looking at short-term chaotic political values, we can pinpoint where we are in the generational cycle, and thus make very accurate and specific forecasts.

Some techniques in forecasting methodology

Even with all its restrictions, the forecasting methodology can give you a great deal more information than you might think, mainly because you can firmly predict some negatives.

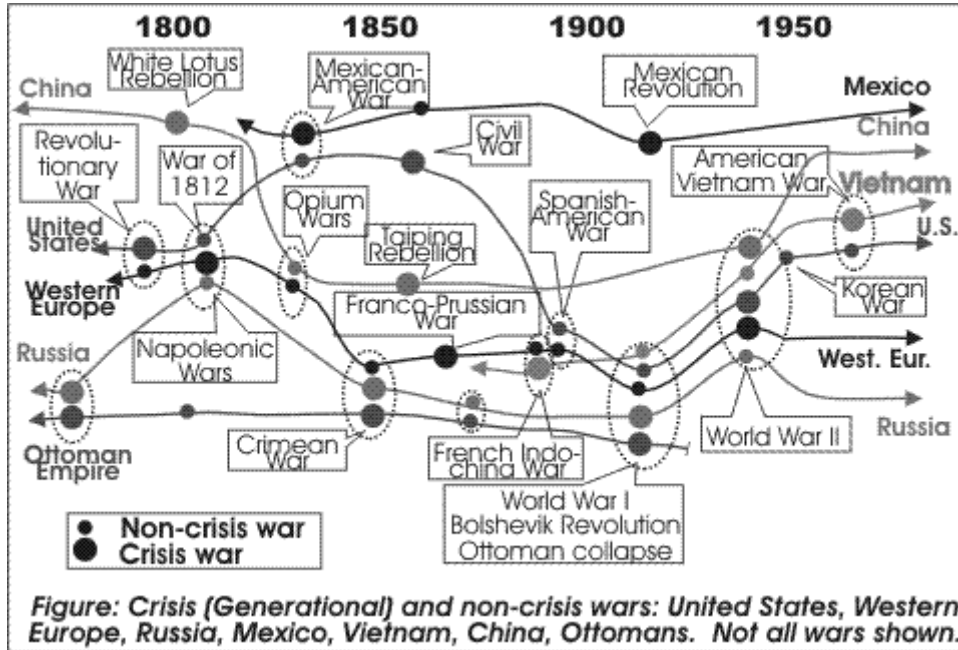
For example, once you know for certain that there will be a new Arab-Jewish crisis war in the next few years, we can predict with certainty that every peace plan will fail with near certainty. Once we know that Iraq is in an Awakening period, then we can predict with near certainty that there won't be a Sunni-Shi'a civil war. Once you know that a crisis war has begun in earnest in Darfur, then you can predict with certainty that it will run its course, and that the UN will fail to stop it.

Even though these examples are all negative predictions, they still contain a great deal of important information.

So here are some techniques in the forecasting methodology:

- For each society, region or nation under consideration, develop its history for several centuries back. Look for the "big picture" on major ethnic, religious and racial conflicts. This kind of information is not always easy to get, since many societies wish to hide these kinds of hatreds, but they're essential to understanding generational timelines.
- For each society, region or nation under consideration, identify all crisis and non-crisis wars. A crisis war is usually characterized by high genocidal energy, a willingness to exterminate the enemy, or to risk extermination of one's own army rather than retreat. Remember that you can't

understand any war just by looking at one nation's point of view; you have to study each nation's treatment of the war to understand it. If you wish to try representing the situation graphically, you may wish to try something like the following:



Crisis and non-crisis wars for several countries and regions

- If possible, do a financial analysis of each nation, to the extent of determining major financial crises. Generally speaking, the period after a crisis war is a time of great prosperity, since there is plenty of food, land and other resources for the reduced population, and a financial crisis indicates a generational crisis period.
- Familiarize yourself with all the characteristics of each of the generational periods - austerity, awakening, unraveling, crisis. There are many examples and discussions scattered around my web site. Briefly: Austerity is a time of great caution and national unity; awakening is a time of a massive political conflict between generations; unraveling is a time when all societal norms and rules unravel; crisis is a time of increasing national unity, and hardening of opinions along historical fault lines, leading to a genocidal crisis war.
- For each society, region or nation under consideration, use the above to determine what generational period the country is in.
- Read the news of the nation on a daily basis to discern how the nation is changing. Important: Make sure that you look for changes in behaviors

and attitudes of large masses of population; changes in attitudes of politicians are irrelevant, except insofar as they reflect the will of the people.

- During awakening periods there'll be increasing social conflict – religious splits, labor unrest, demonstrations, riots, low-level violence, police crackdowns – but no major civil wars or uprisings.
- If a war begins between two nations both in a crisis period, then the war will spiral out of control into a major war.
- If a nation in an unraveling period begins a war, it will try to resolve the war quickly.
- If a nation in an awakening period begins a war, the war may grind on for a while, but it will not be genocidal.
- Be sensitive to “triggering” events that might cause political or low-level conflict to spiral out of control into a major war. However, this can only happen during a crisis period.
- **Most important rule of all:** Do not let politics influence your analysis. I've accomplished this on my web site, but my experience is that almost everyone is either pro-Bush or anti-Bush and lets those feelings influence his opinions. To understand Generational Dynamics you *must* understand that America would be in the same place today if Al Gore had been President the last four years, and that forecasts for the future would be the same if John Kerry had won in November, 2004. If you don't understand that, then you're wasting your time trying to learn Generational Dynamics.

There are many further examples and discussions on my web site, and these articles provide more guidance and information on making forecasts and predictions.

Don't expect this to be easy. When I was first getting started, it often took me three or four days of studying various sources just to analyze a single war. As time has gone on, I've been able to proceed much more quickly, but it still requires study of several sources to determine a country's timeline.

Analyzing political events

Political events are like crack cocaine. Commenting on political events is an obsession, but you're wrong as often as you're right.

Actually, it's easy to get a million political predictions right. All you have to do is make two million predictions. That's all the political forecasting is. You flip a coin to make your prediction, and half the time your prediction turns out right, and you forget about the other half of the time.

Generational Dynamics forecasts are right with nearly 100% certainty, provided that you follow the rules. So what *are* the rules for commenting on daily news and political events?

Here are some general rules to follow when looking to interpret political events:

- **Mass support rule** If there's a sudden shift in public opinion, and it appears to be lasting, then it should be significant. Hopefully, the change in public opinion will be consistent with standard long term trends identified by Generational Dynamics, such as attitudes toward gender roles or wars.
- **Civil unrest** If civil unrest occurs, make sure that it's being driven "by the people," rather than a few politicians. Civil unrest driven by politicians is sporadic and occasional; civil unrest from the people is continuous and flowing.
- **Cycle rule** When making historical comparisons, compare today's crisis era events with the last crisis period, which was WW II for America. Also, compare awakening periods only to awakening periods, such as by comparing Iraq today to Iraq's expulsion of the British troops in 1947.
- **Non-volatile rule** Day to day stock prices are so volatile that they're meaningless. However, there are some financial measures that are far less volatile, and so can indicate trends; these are things like inflation rates and long-term price/earnings ratios.

Introduction to Chaos Theory

With that lengthy introduction to forecasting techniques, we now turn to the use of Chaos Theory to provide the theory support for Generational Dynamics.

Chaos Theory is a new branch of mathematics that was born in the 1960s and has only become seriously studied since the late 1970s.

We give here a brief introduction to Chaos Theory and its sister, Complex Systems Theory (also called Complexity Theory).

If you wish to become a "Generational Dynamics forecasting guru," then you have to have a good feeling about the difference between linear and non-linear systems, chaotic and non-chaotic events. For that reason, you're encouraged to read any of a number of popular books on Chaos Theory that go well beyond this brief introduction.

Weather Forecasts and the Butterfly Effect

Chaos Theory is mostly unknown to the public except for one concept, the "Butterfly Effect."

The popular understanding of the Butterfly Effect is as follows:

If a butterfly in China flaps its wings, it can cause a hurricane in America.

This statement of the butterfly effect contains a grain of truth, but it's technically incorrect in important ways. Furthermore, the nature of the technical error is similar to the kinds of errors that journalists, pundits and analysts make on a daily basis in their own forecasting. So it's worthwhile to explore exactly what the butterfly effect really means.

The bottom line is that it is not possible, and will never be possible, to forecast the weather more than a few days in advance. This flies in the face of many people's expectations. People believe that, as time goes on, we'll figure out how to do the science and engineering that will let us predict the weather precisely, as far in advance as we want. But Chaos Theory in general, and the Butterfly Effect in particular, tell us that it's actually *mathematically impossible* to predict the weather more than a few days in advance.

In fact, Chaos Theory was first conceptualized in the 1960s because of the difficulty in developing software models for weather forecasting.

What causes a hurricane? More prosaically, what causes a sunny day, a cloudy day, or a rainy day? What are the conditions that give rise to each of these weather patterns?

Attempts to develop computer models to address exactly that question ran into an impenetrable roadblock in the form of the following observation:

Suppose you have a computer program that forecasts the weather, based on inputs like air temperature, wind speed, barometric pressure, and so forth. Then you can run your program and get a forecast for the next few days.

Now suppose you rerun the program, but change the inputs only slightly. For example, if you initialized it the first time with a temperature of 39 degrees, then change the temperature to 39.001 degrees. Or change the wind speed from 2 mph to 1.9999 mph.

You might think that such a tiny change in initial conditions would not affect the final weather forecast, but in fact, if your weather forecasting program is realistic, then you'll find that even these tiny changes can have enormous changes in weather forecasts.

So that's why the above statement of the Butterfly Effect is technically incorrect. If a butterfly in China flaps its wings, that doesn't *cause* a hurricane; rather, it changes the initial conditions enough so that there might be an extra hurricane,

or one less hurricane, or a later or earlier hurricane, or it may make a sunny day rainy or a rainy day sunny.

Let's restate the Butterfly Effect in a slightly different manner:

If a butterfly flaps its wings in China, it creates a chain reaction that can change the weather around the world, possibly even resulting in a hurricane in North America.

Here's another way of looking at it: Suppose you could make a second copy of the earth which was identical to the original except for one thing: In one earth, the Chinese butterfly flaps its wings, and in the other earth, the butterfly sits still.

Now, suppose you could watch both earths and see what happens.

What you'd see is that the two earths would not remain identical for long. Thanks to that one tiny initial difference (butterfly flapping wings versus sitting still), the weather on the two earths would quickly begin to differ. The tiny breeze caused by the butterfly in one world would move enough air molecules to make a small breeze somewhere to blow a very tiny bit faster, just enough faster to feed into a stronger breeze somewhere else which, in turn, causes clouds to move in one direction instead of another, which changes a sunny day to a cloudy day, or vice versa.

So the point is this: when the Chinese butterfly flaps its wings, then things change in an unpredictable way.

But is it really unpredictable? Can't a powerful computer compute exactly what would happen?

No, that's impossible, because the computer would have to be too big. True weather forecasting would require simulating the actions of every molecule on the earth, and no computer smaller than the earth itself could perform such a simulation.

There's another reason, too. Computers cannot do precise computations, but can only approximate such things as position and speed. These approximations themselves amount to changes in initial conditions that would have the same explosive effect as the flapping of a butterfly's wings.

So precise weather forecasting is literally impossible, and even predicting the effect of a butterfly flapping its wings in China is also literally impossible.

Again: The butterfly flapping its wings doesn't *cause* a hurricane; it *causes* a tiny change in initial conditions which may or may not cause small or large weather changes which are entirely unpredictable.

Chaotic behavior and the double pendulum

You might think that the reason that weather forecasting is chaotic is because it's so complex. After all, weather involves the entire earth.

So let's look at a much simpler example, a double pendulum. Spend a few minutes playing around with the double pendulum simulation on the following page:

[<#stdurl http://www.mathstat.dal.ca/~selinger/lagrange/doublependulum.html#>](http://www.mathstat.dal.ca/~selinger/lagrange/doublependulum.html#)

(This example requires that your browser support Java.)

As you play with the double pendulum, notice the following:

- Each time you restart the pendulum, it appears to work the same for about a second, but then it acts differently each time. In this case, the "butterfly" is tiny little differences in timings on your computer, each time you run the simulator. These tiny little differences multiply and grow, to become major differences.
- You can watch the pendulum all day, and it won't ever settle down to a repeating pattern. It always acts "chaotically," bouncing around every which way, and a different way each time around.

The double pendulum is a great example because you can actually see chaotic behavior in action. In the case of weather forecasting, you have no way of starting the earth over and over again on the same day to see different weather patterns develop each time, but with the double pendulum simulator, you can do exactly that.

Make sure that you get a feel for why the chaotic behavior double pendulum is important, because understanding that behavior, and applying your understanding, is crucial to understanding the Generational Dynamics forecasting methodology.

Here's a particular experiment you should try: Click on the "Parameters" button to open the control box. Notice the "Total energy (in J)" field reads 289.7. (In physics, a single unit of energy is 1 joule, and so this field indicates 289.7 joules.) Now go back to the moving pendulum, and click on the top center of the square. You'll see that this drags the inner pendulum to the top of the screen, and you'll see that it also changes the value of the total energy field. If you play around with clicking in the square at different times, you'll see that you can either reduce or substantially increase the total energy in the system, to as much as several thousand joules.

Now here's the experiment: Click at the right time so that you get the energy above 800 joules, and watch what happens to the double pendulum. You'll see that it exhibits its usual chaotic behavior at first, but then something very strange happens: After a while, it settles into a large, very non-chaotic circle.

The large circle configuration is called a "cyclical attractor." This exhibits a phenomenon of chaotic systems: That sometimes the elements of the system are "attracted" to an ordered pattern. This is an example of another phenomenon: That sometimes, chaotic systems exhibit an ordered pattern described by such an attractor.

The “attractor” concept is important to our discussion, since later we're going to show that the Generational Dynamics cycles represent a cyclical attractor within the chaos of societal politics.

Linear and Non-linear systems

Here are two more terms you should be familiar with: linear and non-linear systems.

Suppose a basketball is sitting on the rug on your floor, and suppose you push the ball lightly. Then the ball moves a few inches. Now suppose you push the ball hard. Then the ball moves a lot farther.

You and the ball form a “linear system,” which means that a small push gets a small reaction, and a large push gets a large reaction. That's what you would expect, right?

But that's not what happens in the double pendulum. Even the tiniest of perturbations completely changes the behavior in a wild, unpredictable way. It's not a linear system.

Neither is the weather. A tiny butterfly's wings can result in major changes.

So a linear system is one in which the size of the reaction to a perturbation is proportional to the size of the perturbation; a non-linear system is one in which the size of the reaction to the perturbation is independent of the size of the perturbation.

A mathematical consequence of this distinction is that a non-linear system cannot be controlled by perturbations. In real-life, this means that political events cannot be controlled by politicians.

The chaos of day to day politics

Like weather events, political events are completely chaotic. Election polls are like weather forecasts – they're only good for a few days.

Almost anything has the potential to sway public opinion. A dumb remark by a politician, an affair or a long-forgotten sex scandal, an erratic husband or wife, an endorsement by an outsider, a drunken admission, even a change in the weather – any of these can turn the public for or against a politician or an issue.

Day to day political events are completely chaotic. A political forecast of almost any kind has less longevity than a weather forecast. And once you accept that, here's a consequence that you may not have thought of: The acts of politicians have little or no impact in the long run. How could they, if any political policy can be easily derailed by the smallest “butterfly”?

It's worth thinking about this for a while, because it's important. All the bitching and moaning about President Clinton's policies and/or President Bush's policies is for nought, since their policies are for nought.

Before I ever heard of generational studies, even before 9/11, I saw a television interview with Supreme Court Chief Justice Rehnquist, and he said one thing so remarkable that I made a note of it. It was on July 4, 2001, and he was asked to describe which of his Court opinions would have the greatest effect on the country and history. He said (paraphrasing): "The opinions that I thought would be most harmful haven't been as harmful as I thought; likewise, the opinions that I thought would be most beneficial haven't been as beneficial as I thought. So the opinions of the Supreme Court perhaps make much less of a difference than we'd like to think they do."

This relates to some points that I made in my last book. If Thomas Edison had never been born, does that mean we'd still be using candles today? No, of course not; someone else would have invented the electric light bulb. If Martin Luther King had never been born, does that mean that the civil rights laws would never have passed? No, of course not. Someone else would have stepped up and led the fight for civil rights.

The same sort of thing is true for crisis wars. Julius Caesar may have started a brief and inconsequential civil war by crossing the Rubicon, but no one person could have started the highly emotional and genocidal civil war in Rwanda in 1994. Assassinations of one kind or another happen all the time, but no one could have known that one particular assassination in 1914 would have triggered World War I. The great crisis wars are huge pulses of energy that ripple through history like tidal waves (tsunamis).

As Leo Tolstoy said in *War and Peace*,

In historic events, the so-called great men are labels giving names to events, and like labels they have but the smallest connection with the event itself.

Here's one more quote: These are Tony Blair's words when he addressed a joint session of Congress on July 17, 2003, explaining the need for the Iraqi war:

I know it's hard on America. And in some small corner of this vast country, in Nevada or Idaho, these places I've never been but always wanted to go, there's a guy getting on with his life, perfectly happily, minding his own business, saying to you the political leaders of this nation: Why me? Why us? Why America?

And the only answer is: because destiny put you in this place in history, in this moment in time and the task is yours to do.

In each case, the message is the same: Great events are driven by powerful historical forces. History may recognize a particular politician as the agent of change, but the great event will occur irrespective of anything that any politician does or does not do.

Isaac Asimov's *Foundation* Trilogy

Isaac Asimov may well have been one of the most brilliant science fiction writers ever because he was so far ahead of his time, even by science fiction standards. His *I, Robot* foresaw a world that's not too far off and was portrayed in a recent movie except, of course, the "Three Laws of Robotics" will never be implemented. (See p. 140.)

One of his major works was a three-volume series, *Foundation*, *Foundation and Empire*, and *Second Foundation*.

The premise of these novels is that a genius, Hari Seldon, develops a theory called *psychohistory*, and is able to use it to predict the future many centuries in advance. Seldon also provides guidance to his followers on how to win wars through cunning, rather than violence. He even predicts the results of elections.

In the story, Seldon's followers succeed with his plan for a couple of centuries, until a freak mutation creates someone called "the Mule." The Mule is a villain who has the ability to control other people's emotions. Because he is so powerful, and because he was unanticipated by Seldon, the Mule alone is able to change history, and to thwart Seldon's psychohistory plan.

In Asimov's vision, the future can be predicted and even controlled, based on mathematical formulas and computer computations. The predictions could be thwarted only by a force that was very large and powerful.

Of course, this was written in the 1940s, well before the wide availability of computers, and well before the discoveries of Chaos Theory. We now know that weather forecasts and political forecasts aren't much good for more than three or four days. We also know that it doesn't take something as powerful as the Mule to change the weather or to change history; it only takes something as small as an ordinary butterfly.

But Asimov's work raises an important question that needs answering: What can you predict, and what can't you predict? If crisis wars are like huge pulses of energy that ripple through history, how do we distinguish the pulse from the chaos? If Asimov had wanted to rewrite the *Foundation* trilogy with Chaos Theory in mind, what could he have allowed psychohistory to predict (like crisis wars), and what would he have to have left to chance (like election results)?

Introduction to attractors

The discovery in the 1960s that weather forecasting more than a few days in advance is impossible, and always will be impossible, was a shock to mathematicians and scientists alike. That's because weather is a non-linear system, meaning that the tiniest perturbation (like the flapping of a butterfly's wing) can have

wild, chaotic effects on the weather that would invalidate any forecasting attempt.

Not being able to forecast weather was bad enough, but they realized that the same conclusion applied to all sorts of other nonlinear systems, things as varied as a dripping faucet, the stock market, politics, gypsy moth populations, the flight of an airplane, and the movement of human heart muscles. If something as simple as the double pendulum (discussed above) was a nonlinear, chaotic system, then almost anything else could be.

As Chaos Theory was developed in the 1970s, a sister theory was born, Complex Systems theory. (Some people call it "Complexity Theory," but I reserve that name for the study of the complexity of computer algorithms.)

If the purpose of Chaos Theory is to find chaotic, nonlinear patterns throughout nature, then the purpose of Complex Systems theory is to bring order out of the chaos.

"But in the 1970s a few scientists in the United States and Europe began to find a way through disorder. They were mathematicians, physicists, biologists, chemists, all seeking connections between different kinds of irregularity. Physiologists found a surprising order in the chaos that develops in the human heart, the prime cause of sudden, unexplained death. Ecologists explored the rise and fall of gypsy moth populations. Economists dug out old stock price data and tried a new kind of analysis. The insights that emerged led directly to the natural world – the shapes of clouds, the paths of lightning, the microscopic intertwining of blood vessels, the galactic clustering of stars. [James Gleick, *Chaos: Making a New Science*]

The idea is this: Most chaotic systems of interest have many, many interacting objects, all of which act and interact in a chaotic manner. But suppose that you can step back, and look at the chaotic system at a distance. Very often you see that the innumerable chaotic objects, when viewed from that distance, form patterns that you're unable to see when you're looking at the objects up close.

Think of it this way: If you're scuba diving, and you're underwater, watching the ocean water swirl around you, then the movements of the water molecules around you are totally chaotic. But now, swim to the surface and climb into the boat, and you can see that all those tiny water molecules are forming gentle waves that move across the water's surface. How is that possible? How can a mass of individual water molecules, swirling in individual random, chaotic directions, possibly get organized enough to form waves? That's the kind of question that Complex Systems theory seeks to answer.

And the mathematical answer is called "attractors." You start with thousands or millions or billions of individual air molecules or water molecules or other objects. Each of the individual objects acts independent in a chaotic matter. However, even though the tiny individual objects act independently, they're still

“attracted” to act in a certain way that gives rise to recognizable patterns, such as the waves in the ocean.

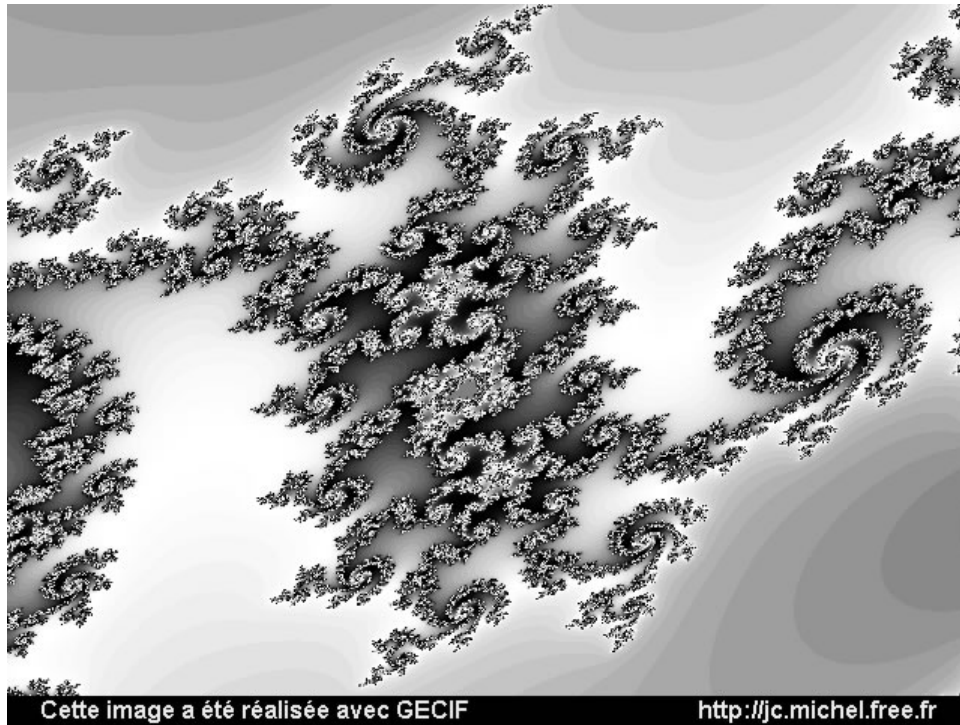
The concept of attractors has solved many problems in physics and mathematics in the last few decades.

If you wanted to apply precise physical formulas to individual air or water molecules, you'd soon be lost. In fact, it's been long known that the “three body problem” cannot be solved in a meaningful, closed manner. That is, physicists can give you formulas for two interacting bodies, such as the motion of the earth around the sun. But as soon as you have three objects interacting with each other, then physicists can't give you an answer any more. So hey, if you can't give formulas for three interacting objects, then you won't get answers for millions or billions of interacting objects.

But the mathematics of Complex Systems and attractors solves many of the problems. You can't get formulas for each of the individual air or water molecules, but you *can* get formulas for the attractors, which describe how the system works as a whole.

Fractals

We start with fractals because they're so well known, even though fractals don't directly correspond to the Generational Dynamics model we're coming to.



Fractal graphic generated by a commercial software program

The above graphic illustrates a fractal image. If you go on the internet and type “fractal” into a search engine, you’ll have the opportunity to view as many fractal images as you want, many of them quite beautiful.

By definition, a fractal is a complex system that looks the same, no matter how much you magnify it.

If you look at the above image, you’ll see that it’s composed of repeating patterns. If you could zoom in on one of those patterns, you’ll find that the zoomed image is very similar, contains the same patterns, as the original image. If you then zoom in further, you get the same result.

Fractal images represent the attractors in certain types of mathematical systems. Both mathematicians and biologists consider fractals to be of major importance, because the mathematical process that’s used to create fractals exactly mirrors the process that nature uses to create most (or perhaps all) of the shapes that appear in nature. The shapes of flowers, leaves, clouds and so forth are built up in nature in the same way that fractals are built up according to repetitive application of mathematical formulas.

If you haven’t already done so, you should type “fractal” into a search engine, and explore the numerous fractal images on the internet. See for yourself how you can zoom into a fractal and see the same pattern repeat itself in microscopic form.

Attractors in generational systems

As we discussed previously, any political system is non-linear and chaotic. Any small "perturbation," can change the results of an election, or of public opinion, within a few days. When pundits say, "A week is an eternity in politics," they're saying that politics is a non-linear system.

From the point of view of Chaos Theory, the principal discovery of Generational Dynamics is that the generational cycle is an attractor for the chaos of political events.

However, it's not an attractor as in fractals, because you can't zoom in and zoom out and see the same pattern. It's more like the ocean wave example, where you can zoom in and see individual water molecules zooming around chaotically, but then zoom out and see them form a cyclical attractor pattern of ocean waves.

When you zoom into the political system, all you see are individuals making individual political decisions every minute of every day. If a politician says something dumb, then the system is perturbed, and people's politics change. If there's an "event," such as a major fire, an earthquake, a terrorist attack, a crime, or even a love affair, how a politician reacts can change many political views.

But the generational cycle is not affected by these perturbations. Crisis wars happen every 70-90 years or so, in every society, and it doesn't matter if there's an earthquake, a crime or an illicit love affair.

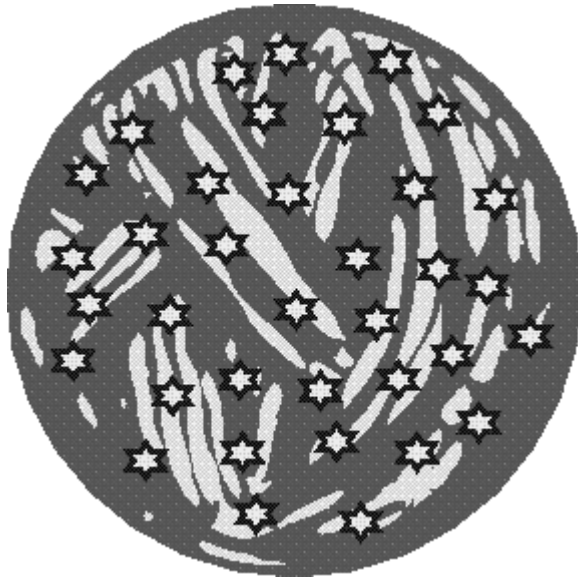
Generational Dynamics world model - magic ball of yarn

You can think of a fractal as a graphical representation of an abstract model of a world represented by certain mathematical formulas. (We are not discussing the mathematical formulas that generate these "worlds," but you can find discussions throughout the internet.)

What's special about the fractal is you can view the fractal in different ways – zooming in and out, for example, and it always looks the same.

We're now going to discuss a Generational Dynamics abstract model of the world - not just any world generated by a formula, but generated by our real world, and not just the world today, but the world through time.

An abstract mathematical model of the world isn't of much use unless you can prove that the model represents "truth" in the real world. Establishing this "truth" is the purpose of many of the other chapters of this book, showing that crisis wars, awakenings, and generational cycles occur in all regions, societies and nations of the world throughout history. In this chapter, we assume those findings from other chapters.



Magic ball of yarn (whole world view)

There is no simple graphical representation of this abstract world, as there is in the case of fractals. However, in order to make the abstract model easier to understand, we'll describe a physical representation of the model, which we call a "magic ball of yarn."

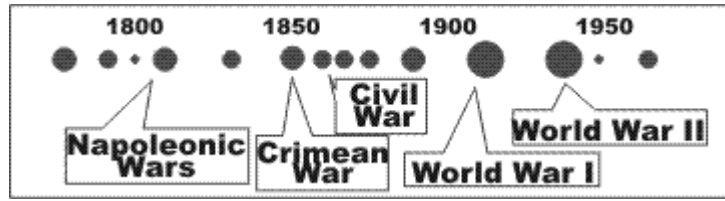
We will examine many different views of the abstract model. However, the abstract model is not a fractal, so the different views won't look the same. That's the power of the model, because each of the different views reveals something dif-

ferent and something new. In this sense, the model will be more like the ocean waves, which look very different when zoomed into the water and zoomed out above the waves.

Let's describe the model through the magic ball of yarn representation:

- **Whole World View** Look at the magic ball of yarn as shown in the above graphic, from a couple of feet away. This view is the standard historical view of world history. From this view, you can see tiny little lights on strands of yarn throughout the magic ball. Each little light represents a war. So, as you look at the ball of yarn from this view, you see wars scattered chaotically throughout different nations throughout history. This is view used by analytical historians when they try to find patterns of wars throughout history. The fact that the wars are scattered chaotically explains why these researchers have pretty much failed to find any such patterns.
- **Chaotic View** Next, zoom in on one of the strands of yarn. Each strand represents a single society or nation through time, so if you zoom in to a single strand, then you're standing in the middle of ordinary day-to-day politics. In this view, there's no order whatsoever. All political events are completely chaotic. A political forecast of almost any kind has less longevity than a weather forecast, and acts of politicians have little or no impact in the long run.

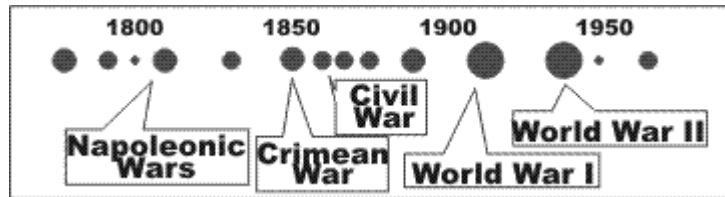
From the chaotic view, you can look around



Magic ball of yarn (chaotic view)

you and see the other wars, looking something like the adjoining graphic. In this view, wars are still chaotically scattered, and there should be no pattern. However, analytical historians *have* found a pattern - the Kondratiev Cycles (K-Cycles) pattern - that was developed in the 1920s to try to account for wars, including the horrific Great War (WW I). The K-Cycles theory pretty much fell apart in the 1940s, because it didn't predict WW II. Since that time, attempts have been made to revive it. In Chapter xxx (p. 131), we'll discuss another view of the magic ball of yarn model that explains why the K-cycles worked earlier in the millennium, but not later.

- **Localization View.** This view recognizes



Magic ball of yarn (localization view - one nation)

the Principle of Localization from Generational Dynamics, and focuses on an individual society or nation. You take the magic ball of yarn and you unravel one of the strands of yarn and look at the war patterns on that strand alone. This is the first view where a genuine pattern can be found.

In this view, you examine wars in one society or nation only, and

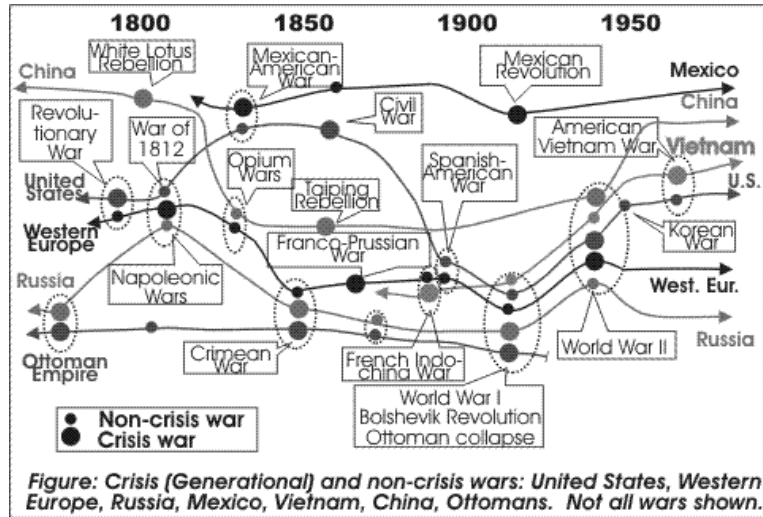


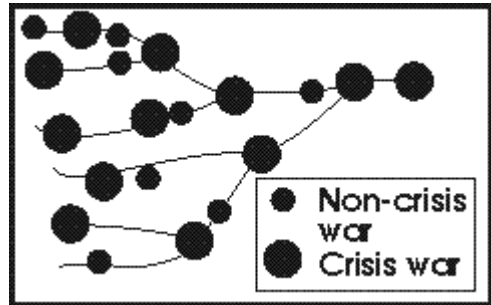
Figure: Crisis (Generational) and non-crisis wars: United States, Western Europe, Russia, Mexico, Vietnam, China, Ottomans. Not all wars shown.

Magic ball of yarn (localization view - several nations)

you apply the Generational Dynamics algorithm to each war to determine whether it's a crisis or non-crisis war, as shown in the adjoining diagram. Once the crisis wars have been identified, the crisis wars are shown to have a pattern, as described in other chapters throughout this book.

You can extend the localization view still farther by unraveling several strands of yarn and looking at them at the same time. In this case, you see that different strands merge together and then diverge on occasions.

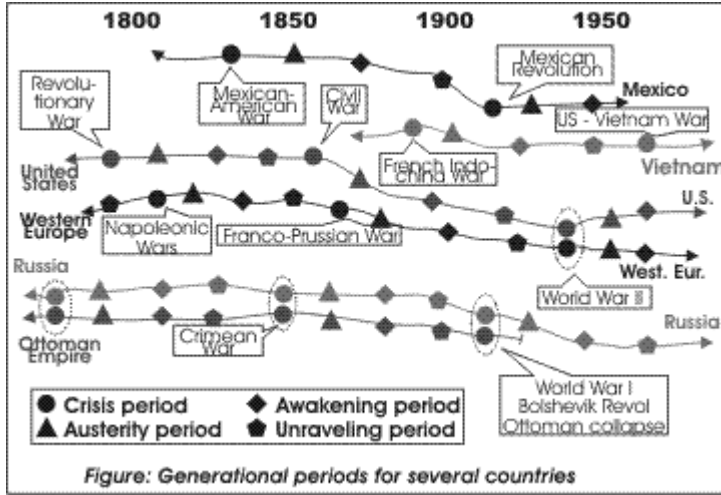
- Merging timelines view.** This view expands the Localization View back to the beginning of history. When you unravel the entire magic ball of yarn, you discover that there are many individual strands of yarn, but that they merge over time, as illustrated by the adjoining diagram. We'll discuss this view more in chapter xxx.



Magic ball of yarn (merging timelines view)

Cyclic variables in generational politics

Although this book focuses on wars, Generational Dynamics establishes many different kinds of patterns, in subjects including politics, culture, technology, economics and international finance, These political, social and cultural values tend to cycle in predictable ways as generations changes, just as wars do.



Magic ball of yarn (localization view with generational eras)

the four generational eras come all the attributes associated with those eras.

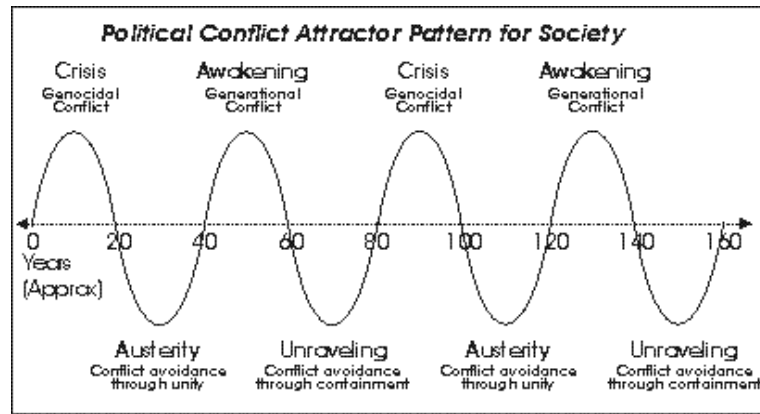
For example, suppose we try to measure the amount of “conflict” in a society over long periods of time. We refer specifically to two kinds of conflict: “genocidal conflict,” which happens in crisis wars, and “generational conflict,” which happens during awakenings. These are the two kinds of conflict that produce the greatest societal changes.

We might diagram it as follows:

In order to identify these additional values, we first have to upgrade the localization view to include all the generational eras, as illustrated in the adjoining diagram. This illustrates a much richer pattern than we saw before.

Along with

This diagram shows what we've been discussing in previous chapters: That conflict levels tend to cycle in predictable ways.



In Chaos Theory there's a concept of a "phase space," which is a graphical representation of the variables which vary cyclically (as opposed to chaotically) in the dynamic systems. In the previous section we talked about the graphic representations of fractals, and those are actually graphs of phase spaces.

Not every aspect of societal life shows a cyclical pattern, as far as I know. For example, the kinds of food we eat may follow an annual seasonal cycle, but they do not follow a generational cycle, to my knowledge.

For the variables that are affected by generational cycles, we turn to the large body of work by William Strauss and Neil Howe in their studies of Anglo-American generational cycles. In their book, *The Fourth Turning*, they describe each of the four cyclical periods as follows:

- **Austerity era (called "High" by Strauss and Howe):** All such eras mark the construction of a new social order. All are regarded, in their own time and after, as "postwar." With epic Crisis settled and the promised land delivered, society accelerates with a newfound solidarity and direction. It is time to reconstruct and savor victory (or recover from defeat). People want to gather, nest plan, procreate, and build. The mood is dynamic: Each new exercise of social cooperation builds on the success of the last, until — near the end of the High — the trend toward greater order and cohesion has become something close to an instinctual drive. (pp. 149-150)
- **Awakening era:** An Awakening is an era of cultural upheaval and spiritual renewal. It begins when the waxing social discipline of the High suddenly seems tiresome, unfulfilling, illegitimate, and unjust — and when people begin to defy it in the name of spiritual authenticity. By now, memories of the last Crisis are buffered by the High's calm and comfort, and the core High virtues are regarded as outmoded, even unnecessary. The Awakening climaxes just after civilized progress reaches a saecular high tide — and just before that progress is overwhelmed by

the liberating passions of reform and protest. The Awakening ends when the new consciousness converts its enemies and the new values regime overwhelms its oppressors. (p. 176)

- **Unraveling era:** [Unraveling eras] have followed a similar path of social entropy and disintegration. The Awakening complete, people are now fully immersed in their own purposes. The new social priority is to atomize, not to gather; people are harvesting, not sowing. Underneath, a new values regime grows and spreads. As large official entities continue to weaken, small informal ones (families, neighborhoods, small enterprises, volunteer groups, cultural niches) revitalize. (pp. 207-208)
- **Crisis era:** History's periodic eras of Crisis combust the old social order and give birth to a new. [A Crisis] is a solstice era of maximum darkness, in which the supply of social order is still falling but the demand for order is now rising. ... These are times of fire and ice, of polar darkness and brilliantly pale horizons. What it doesn't kill, it reminds of death. What it doesn't wound, it reminds of pain. ... Like natural winter, which reaches its solstice early, the [Crisis era] passes the nadir of public order right at its beginning. Just as the coldest days of winter are days of lengthening sun, the harsh (and less hopeful) years of a Crisis are years of renascent public authority. This involves a fundamental shift in social momentum: In the Unraveling, the removal of each civic layer brought demands for the removal of more layers; in the Crisis era, each new exercise of civic authority creates a perceived need for the *adding* of layers. As the community instinct renews, people resolve to do more than just relieve the symptoms of pending traumas. Intent on addressing root causes, they rediscover the value of unity, teamwork, and social discipline. Far more than before, people comply with authority, accept the need for public sacrifice, and shed anything extraneous to the survival needs of their community. This is the critical threshold: People either coalesce as a nation and culture – or rip hopelessly and permanently apart. (pp. 255-256)

Strauss and Howe's brilliant characterizations of the Anglo-American cyclical patterns appear to apply throughout history. Ironically, Strauss and Howe themselves did not believe that the generational cycle paradigm would apply throughout history. They believed that it would apply only to modern times, and then, restricted to modern societies where, "as in America, generations are left free to develop and express their own personalities." (We'll discuss this further in chapter [tftmodel].) But what turns out to be remarkable, as we've shown with our survey of crisis wars throughout history, is that these cyclical patterns always occur, and it makes no difference at all whether or not "generations are left free to develop and express their own personalities."

In fact, nothing makes any difference. The same things happen in democracies, republics, fascist dictatorships, or communist dictatorships. It happens in

Muslim societies, Christian societies, Buddhist societies, and pagan societies. It happens to people with white skins, yellow skins, brown skins and black skins. It happens with vegetarians and meat eaters.

It makes no difference if a society or nation is technologically advanced or backwards, moral or immoral, rich or poor, religious or atheist, artistically enlightened or poetically challenged. Every 70-90 years that society or nation tries to obliterate another society or nation.

And crisis wars begin in all different kinds of ways. Sometimes there's an obvious agent of war, such as Adolf Hitler or Napoleon Bonaparte or Chief Shaka of the Zulus or King Louis XIV of France. In other cases, wars begin in a way that resembles spontaneous combustion, as in the Rwanda genocide of 1994, the assassination that sparked WW I, China's Taiping Rebellion, or the Reign of Terror that grew out of the French Revolution.

Midway between crisis wars there are Awakening eras, characterized by generational conflict. There are always riots and demonstrations, usually by students against aging politicians, with China's 1989 Tienanmen Square demonstration being one of the most famous of recent times. There's almost always an element of spirituality: England's Puritan awakening of the early 1600s, America's anti-Puritan awakening thirty years later, America's Great Awakening of the 1730s, America's "God is Dead" awakening in the 1960s, or the Sunni versus Shi'a theme in Iraq today. Gender issues (or "women's issues") often become paramount in awakenings, whether it's "women's lib" in America's 1960s, showing the Can-Can in 1890s Paris, or Caesar making Cleopatra ruler of Egypt during Rome's awakening period in the 40s BC. Public concern for minorities appears to increase during awakenings, and labor turmoil seems to increase.

So the political issues that give rise to the four generational eras vary from society to society, and from century to century. But the generational cycles occur nonetheless, always in the same order, and always with the same results.

That's why the variables we've discussed – riots, genocidal conflict, generational conflict, spirituality, gender issues, concern for minorities, and labor turmoil – form the "phase space" variables and the attractors that bring order out of the chaos of day-to-day societal politics.

"Looking for reasons"

One stock market commentator defines a bear market as a time when "investors are looking for reasons to sell," and a bull market as a time when "investors are looking for reasons to buy."

This is a great characterization, because it zeroes in on the true meaning of an attractor.

During an unraveling era, a country looks for compromise and containment when problems occur; during a crisis period, a country looks for confrontation.

But neither of those characterizations is monolithic. It doesn't mean that everyone wants to compromise during an unraveling era, or that everyone wants to confront during a crisis period.

It means that during an unraveling period, people "look for reasons to compromise," but during a crisis period, people "look for reasons to confront."

There are always plenty of reasons for investors to buy or sell stocks, and there are always plenty of reasons for the public to favor compromise or confrontation.

But during one period or the other, the investors or public "look for reasons" to go in one direction or the other.

"Basins of attraction"

Here's one more way of looking at it.

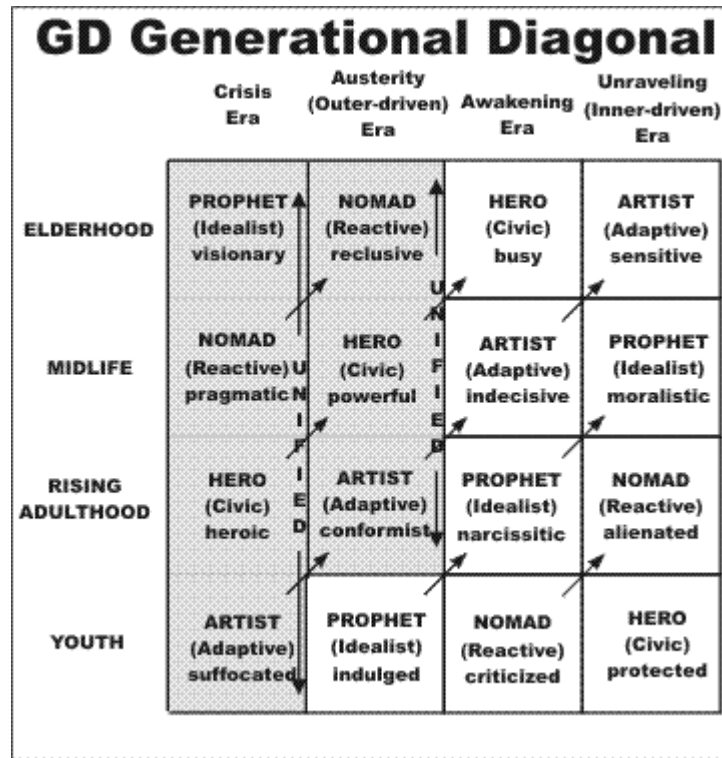
Imagine that you're rolling a ball inside a round bowl or basin. The ball will roll around the sides and eventually settle at the bottom of the basin. If you then perturb the ball or push the ball or smack the ball, it will roll around some more, but once again it will settle on the bottom. Thus, the ball is "attracted" to the bottom of the bowl.

Chaos Theory refers to the concept of "basins of attraction." The idea is that a chaotic system can settle down into a cyclic pattern defined by a cyclic attractor. But in order to be able to claim that a pattern is truly an attractor, then you have to be able to prove that it's like a ball in a basin: If you perturb the system while it's cycling through the pattern, then it had better return to the pattern again.

Behavior in a basin of attraction is the opposite of chaotic behavior. When you perturb an object behaving chaotically, then the perturbation changes the object's behavior in a wild, unpredictable manner.

But if you perturb an object in a basin of attraction, then the object returns to the same behavior as before the perturbation, just as a perturbed ball in a basin returns to the bottom of the basin.

In fact, in chapter xxxx we already showed that the generational paradigm is extremely robust, and returns to the pattern even if perturbed. This is shown through the following diagram:



The Generational Dynamics Diagonal Flow Diagram

This diagram shows how generations change through the entire generational cycle. The darkened squares are the ones that show that the generational paradigm is indeed in a “basin of attraction.”

Suppose you perturb the society with an unexpected crisis war, literally putting the society in mortal danger, so that the society is in the left-hand column with the wrong generations in place. However, at the time of such a crisis, all generations must unite for survival, so generational differences are muted. This unity continues through the Austerity period, and only comes apart during the political conflicts of the Awakening period. But whatever their generational archetype when they entered the Crisis period, they'll become heroes for having fought in the crisis war. The youth generation will be Artists for having grown up during a crisis war. By the Awakening period, the other two generations will have disappeared (retired or died).

This shows that if a perturbation occurs in a society, even a huge perturbation like an unexpected crisis war, then the generational change pattern corrects itself very quickly – within just two generations. This shows clearly how powerful and robust the generational pattern is.

The “Puritan Flip” in Colonial America

In order to claim that generational cycles form a strong cyclic attractor in the sense of Chaos Theory, we have to show their robustness, meaning that the cycles continue even when perturbed.

One of the most interesting examples of the robustness of the generational paradigm is the Puritan Flip, described on p. 266. Briefly, it happened as follows:

England went through the Puritan Awakening period beginning in 1604, when James VI ascended to the throne, sparking first widespread opposition to Anglican Church. By 1606, a separatist church had been formed by the Puritans, and they were so harassed that they were forced to flee to Holland. This was the group of Pilgrims that landed at Plymouth Rock in 1620.

Intuitively, one would expect the Pilgrims to retain the same generational archetypes in the colonies that they'd had in England, but remarkably they didn't. Instead, something quite different happened, a kind of “awakening inversion” that flipped the colonial turnings around from what they were in England.

The migration of Englishmen to colonies was not unlike a crisis period in the following sense: Petty political and personal differences had to be put aside, and all generations had to unite in order to survive in the new land. Thus, during the period 1610-30, while the Puritan awakening was going on in England, the Puritans who migrated to the colonies were actually going through a kind of Crisis period, before things settled down into an Austerity period.

During an Austerity period, everyone unites to impose a structure on society to protect it. The kids born during the Austerity period rebel against this structure, and that's what causes the Awakening period. In the case of the colonies, the structure was based on Puritan principles, and when the Awakening era arrived, it was to rebel against Puritanism.

So, when the Pilgrims rebelled against the Anglican Church, Puritanism was the “new thing,” the “cool thing,” the “hot thing” for their time. When they migrated to the colonies, the kids grew into obnoxious Puritan adults, and their kids rebelled against them. Thus, the migration was a kind of pseudo-crisis that forced the unification of the generations, but the kids born after the migration had the same sort of generation gap that appears in all awakenings. So, by the 1640s, when England was having a violent, genocidal crisis civil war, the colonies were going through an awakening, with kids rebelling against old, stodgy Puritanism. This put the colonies onto an entirely different schedule, two generations out of phase with their parents in England. New England's next crisis war came on schedule with King Philip's war, beginning in 1675. America's timeline didn't merge again with England's timeline until World War II.

The Puritan Flip is a great illustration of the robustness of the generational paradigm. In particular, it shows that if there's a perturbation, then the standard

generational pattern is fully reestablished within two generations following the next crisis war.

Phase Locking and Entrainment

How is it possible to go from a chaotic view to an ordered view? How can a system consisting of thousands or millions or billions of individual objects, each one acting chaotically, possibly “work” together well enough to exhibit any sort of pattern? More specifically, how does an “attractor” work, anyway?

In order for the individual objects, each acting chaotically, to behave collectively so that the system as a whole is ordered, some sort of synchronization must occur. This is usually called either “phase locking” or “entrainment.”

“Entrainment” is the more restrictive form of synchronization. It occurs when the individual objects we're talking about all continue their behavior as before, but slowly “train” one another to act together.

There are examples of entrainment throughout nature:

- You could have a field full of crickets, each of them chirping individually. But as time goes on, they all start to “entrain” one another to chirp at the same time, so that they're all finally chirping in unison.
- Similarly, a population of fireflies will, after a time, all flash together, in unison.
- A group of women living together will often use entrainment to synchronize their ovulation cycles.

These are simple examples of entrainment that occur throughout nature. In each case, you have groups of individuals that normally act and interact in a chaotic manner, but they develop ordered behavior because they entrain each other to synchronize their independent actions so that they act together.

Entrainment is an important kind of phase locking, though it's not the only kind. It's worth looking at these examples because they will provide additional insight into the working of the generational model we're describing. Phase locking will also become an important part of the generational model when we add Kondratiev cycles to it in Chapter xxx (p. 131).

Equilibrium in economic systems

If you don't yet completely understand attractors, entrainment and phase locking, then it may help to relate to a common economic concept: the law of supply and demand.

Consider the microeconomics Law of Supply and Demand for determining prices in a free market. According to this law, prices decrease as supply of a product increases, and prices increase as demand for the product increases. The price reaches an equilibrium equal to the marginal cost of providing (manufacturing and marketing) the product.

How is this equilibrium reached in practice? It's a kind of phase locking mechanism.

Imagine consumers buying loaves of bread from bakers all over the country, and it's "in the old days," so the buyer and baker have to agree on a price. As are all such actions, these are chaotic events, occurring at unpredictable times, with sales at unpredictable prices. And yet, all the price transactions quickly reach an equilibrium price that everyone pays.

The phase locking mechanism that provides that equilibrium is "word of mouth price comparisons." Consumers do price comparisons, and tell each other about them. Newspapers print stories about prices, and tv does news segments. Sometimes consumers might even stage "bread strikes" to convince vendors to bring prices down.

Stores and distributors also compare prices among their suppliers, and choose among the ones with the lowest prices for equivalent products.

Interestingly, manufacturers are not allowed compare prices with one another in order to make the prices as high as possible, since they're forbidden from doing so by antitrust laws. So phase locking occurs entirely at the consumer end, not at the manufacturing end.

Whenever an economic equilibrium must be reached, there is probably a phase locking mechanism like the one summarized above.

Relating this to Chaos Theory, the equilibrium price becomes the attractor. It's a robust, stable equilibrium, because if there's a perturbation away from the equilibrium price, then the price will return to the equilibrium price quickly. For example, if someone tries to charge too much, he'll quickly go out of business, as his competition undersells him.

The equilibrium price is a "point attractor" in terms of Chaos Theory. But now let's extend this example through time, and assume that bread prices tend to be lower in fall, just after the wheat harvests, than they are in the spring.

Then the equilibrium price will show a cyclic, seasonal pattern. This would be called a "cyclic attractor."

Phase locking in the spread of technology

We'll conclude this discussion with one more related example: The spread of technology.

When new technology is developed or invented in one region, then it's quickly copied from region to region, so that all regions are pretty much synchronized with respect to having the latest technology.

Of course, "having the technology" is different from "using the technology." The latter depends on having the appropriate infrastructure to take advantage of new technologies when they come along.

This relates to one theory of non-crisis wars. Generational Dynamics explains crisis wars, but provides no real guidance for non-crisis wars, which are usually purely political. One possible generator of mid-cycle wars is the development of new technology. If one country has the infrastructure to use the new technology quickly, then that country may decide to take advantage of the situation to declare war on another country, without the necessary infrastructure.

Technology is a good example of phase locking that doesn't depend on oscillations, and doesn't depend on entrainment. Technology exhibits exponential growth rather than cyclic growth, but the usage of technology appears to follow a 40-50 year cyclic pattern. This is one of the theories that explain Kondratiev cycles (p. 131).

Phase locking in generational systems

Generational systems use a completely different kind of phase locking from the kinds we've just described. In the examples so far, there were innumerable individuals performing chaotic events which became synchronized in some way because of some kind of "sharing" between the individuals.

Generational systems are quite different because individual people don't "oscillate" in the same way that flashing fireflies and chirping crickets do. In fact, the decades-long time frames for generational patterns do not lend themselves to any of the phase-locking examples we've described.

In generational systems, phase locking occurs because new people are added to the system at roughly the same time (birth of a generation) and leave the system (retire or die) at approximately the same time. Patterns occur because people in the same generation share characteristics, and it's these characteristics that define the ordered patterns.

The crisis wars provide the anchor point to the pattern. Phase locking occurs during crisis periods because all generations unify for the survival of the society or nation, or its way of life. Once the crisis is over, the generation born after the war rebels against the generation of heroes that fought in the war (during the "awakening"), so the phases are locked again into the pattern.

It's remarkable, really, that this pattern occurs over and over: crisis period, austerity, awakening, unraveling, crisis, austerity, awakening, unraveling, and on and on.

And, yes, occasionally the generational pattern is perturbed by an unexpected war, or by an unexpectedly long unraveling period without a war. But as soon as a new crisis war occurs — and it always does, because there's always genocidal competition for food, land, and other resources — then the new crisis war synchronizes the generations again and restarts the generational cycle.

The Six Most Dangerous Regions of the World

The remainder of this chapter is devoted to giving a lengthy example of various techniques in Generational Dynamics forecasting.

Anyone reading my web site realizes that Generational Dynamics predicts that we're heading for a “clash of civilizations” world war in the next few years. We will be using probabilistic forecasting to determine the probability of a major new world war during 2005. (This analysis should be considered correct as of the end of 2004.)

There are six regions in the world (Palestine-Israel, Russia-Caucasis, India-Pakistan, China-Taiwan, Korea-Japan, Western Europe) that are all becoming so tense that a spark could ignite a war in any of them, and a war in any of them would probably trigger a “clash of civilizations” world war.

For almost 20 years, historians have been discussing the possibility of a new major world war, a “clash of civilizations” between Western civilization and Muslim civilization, with well over a billion people on each side.

The concept was popularized by Harvard professor Samuel P. Huntington in his 1996 book, *The Clash of Civilizations and the Remaking of World Order*. In his book, he analyzed Muslim civilizations around the world and discovered, in particular, that population growth was much higher in Muslim than in Western countries, creating a “youth bulge” which, he predicted, will lead to the clash by the 2010 time frame.

Today, thanks to Generational Dynamics, we can get a pretty firm idea of the likeliest scenarios that will lead to the “clash of civilizations” war.

The six regions that we've selected are the most likely to trigger a major war mainly because a war in any of these regions will quickly force America to join the war on one side or the other, usually because of existing treaties. Furthermore, each of these regions is in a “generational crisis” period, which means that even a small regional war in one of these regions is likely to spiral out of control into a very big war.

Here are the six regions:

- **Western Europe-Pacific.** These are the major theatres of World War II. Although there are currently no threats of war among any of these countries, the Iraq war has exposed deep divisions, especially along the historical fault line between England and France.

- **Palestine-Israel.** War between the Palestinians and Israelis is nothing new, ever since the UN partitioned Palestine in 1948, creating the state of Israel. But a new serious war would quickly bring in England and America on the side of Israel, and Egypt and other Muslim countries, and possibly even France, in on the side of the Palestinians.
- **India-Pakistan-Kashmir.** The UN also partitioned the subcontinent into a Hindu portion (India) and a Muslim portion (Pakistan), leaving Kashmir disputed and a source of constant conflict. A new war would be nuclear.
- **China-Taiwan.** Ethnic and social unrest is increasing in China, and tensions between China and Taiwan are growing. America is bound by treaty to defend Taiwan in case of attack from China.
- **Korea-Japan.** America is bound by treaty to defend South Korea in case of attack from North Korea.
- **Russia-Caucasus (including Ukraine).** This region has been the theatre of war for centuries between the Orthodox and Muslim civilizations, and tensions have been growing significantly since the Beslan school massacre.

The above regions are all dangerous for the obvious reasons given, but those regions are particularly important for another reason: They're all in a "generational crisis" period.

We're at a unique time in history because 60 years have passed since the end of World War II, and all the nations who fought in World War II are now making rapid generational changes, all at the same time. In each nation, all the people who have personal memories of the genocidal horrors of WW II are all disappearing (retiring or dying), all at once, and history tells us that that's when the next world war is likely to begin.

From the point of view of Generational Dynamics, different nations and regions throughout history have been on different "timelines," which indicate when major genocidal crisis wars occur. In the last century, most of these distinct timelines have merged into two major ones: A World War II timeline, and a World War I timeline. Of the six regions above, Russia-Caucasus is on the World War I timeline, and the others are on the World War II timeline.

About 55-60 years after one crisis war ends, the last generation of people who have personal memories of the genocidal horrors of the preceding crisis war, the country enters a "generational crisis" period. This appears as a substantial change in attitudes in the public in general. We've already begun to see this in America, with the surprising and unexpected rise of "moral values" as a factor in the last election. Whenever any country enters a generational crisis period, public opinions continue to harden until a new crisis war breaks out.

Opinions and attitudes today have been hardening in each of the six regions we're discussing. Whether it's Palestinians versus Jews, or Taiwan versus Beijing

in China, or the Beslan school massacre in the Caucasus, or the sudden, rapid hostility between Christians and Muslims in the Netherlands, opinions are hardening rapidly in these regions around the world.

Probabilistic Forecasts

In the previous section, we gave some examples of specific forecasts, but they were all negative (there will NOT be a civil war in Iraq).

Positive forecasts are like the saying, "A watched pot never boils." You know that the water will boil some time, but you don't know when. So you can say that there'll be a major Arab-Jew crisis war in the next few years, but you can't say exactly when.

However, it should be possible to give probabilistic forecasts.

We start with this table, which also appears in an earlier chapter. It shows the number of crisis wars that began in a specified number after the end of the previous crisis war:

# years	Fraction of total
0- 40	0%
41- 49	11%
50- 59	33%
60- 69	25%
70- 79	16%
80- 89	4%
90- 99	6%
100-117	5%

This estimate is based on principles of Generational Dynamics which itself is based on studying repeating patterns throughout history.

I took the data that went into this table, I did some smoothing and made some computations involving conditional probabilities, and came up with the following table, which gives the probability of a new crisis war beginning in that year (given that it hasn't already begun in a previous year):

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Yr	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	
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40	0.00%	0.11%	0.23%	0.34%	0.46%	0.58%	0.70%	0.85%	0.99%		
	1.15%										

CHAPTER 4 - CHAOS THEORY AND GENERATIONAL FORECASTING

50	1.31%	1.47%	1.68%	1.90%	2.13%	2.37%	2.83%	3.33%	4.31%	4.31%
60	4.32%	4.32%	4.32%	4.32%	4.33%	4.33%	4.33%	4.33%	4.34%	4.34%
70	4.34%	4.34%	4.35%	4.35%	4.35%	4.35%	4.36%	4.36%	4.36%	4.36%
80	4.37%	4.37%	4.37%	4.37%	4.38%	4.38%	4.38%	4.39%	4.39%	4.39%
90	4.39%	4.40%	4.53%	4.68%	4.84%	5.01%	5.20%	5.41%	5.63%	5.87%
100	6.14%	6.44%	6.77%	7.14%	7.56%	8.04%	8.60%	9.24%	10.00%	10.91%
110	12.02%	13.40%	15.18%	17.54%	20.85%	25.00%	25.00%	25.00%	25.00%	25.00%
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Thus, America's last crisis war ended in 1945, which is 60 years ago, so the probability of a new crisis war beginning in 2005 is 4.32%.

So, we can't predict when America's next crisis war will begin, but we can use just one fact – the time since the end of the last crisis war – to determine that the probability that a new crisis war for America will begin in 2005 is 4.32%.

Now, let's continue with this exploration by using some additional information.

Merging timelines

As we've said, timelines have been merging throughout history, creating two major timelines in the 20th century, the WW I timeline and the WW II timeline.

Today, we're at a unique time in history when even the East European and West European timelines are merging into a "clash of civilizations" world war, with the West on one side and the Muslim civilization on the other.

This brings us back to the six dangerous regions that we began this article with:

- Western Europe-Pacific
- Palestine-Israel
- India-Pakistan
- China-Taiwan
- Korea-Japan
- Russia-Caucasus

Each of these regions had separate crisis wars in the 20th century, with the first five on the WW II timeline, and the last (Russia and the Caucasus) on the WW I timeline.

As an aside, note that some other crisis wars on the WW I timeline have already completed; these include the Iran/Iraq war of the 1980s, the Lebanon/Syria war starting in 1976, the Turkey/PKK-Kurd war of 1984-2000 and the Balkans wars of the 1990s. That's why most of the coming conflict is on the WW II timeline, with a sprinkling of the WW I timeline merged in.

However, the biggest of the WW I timeline wars has yet to be refought: the Russian revolution and the massive civil wars of the 1920s.

Probability of a regional crisis war

Now here's the assumption that I'm making: If a crisis war breaks out in any one of the above six regions, then it won't remain a regional crisis war for long; instead, it will end up engulfing America and all six regions, ending up as a new world war.

Thus, what we need to do is compute the probability that a crisis war will break out in *at least one* of the above six regions.

In order to do that, we have to make one more assumption: That before the world war begins, the probability of a crisis war in any one of those six regions is independent of the probability of a crisis war in any of the others. This is in fact probably true, since each of the previous crisis wars was a separate war.

This assumption will allow us to use the independent probability rule to make computations.

So the first thing we need to do is compute the probability of a crisis war in each of the six regions. To do this, we used the same table of probabilities that we used above to compute the 4.32% value for America.

So, it's now appropriate we ask: What's the probability that *at least one* of these regions will have a crisis war in 2005?

For that, we need to first compute the probability P of a crisis war beginning in 2005 for each region separately, where Y is the year of the last crisis war:

Region	End of last crisis war	P for 2005
World War I timeline		
Russia-Caucasus	Russian revolution, civil war between Stalin and Trotsky, Y=1928, 75 years ago	P=4.36%
World War II timeline		

Western Europe-Pacific	
World War II,	
Y=1945, 50 years ago	P=4.32%
Palestine-Israel	
War between Arabs and Jews,	
Y=1949, 46 years ago	P=2.83%
India-Pakistan	
Muslim-Hindu conflict, World War II.	
Y=1945, 50 years ago	P=4.32%
China-Taiwan	
Civil war between Mao	
Zedong and Chiang Kai-shek	Y=1949, 46 years ago
P=2.83%	
Korea-Japan	
Japanese occupation of China, World War II, partitioning of	
Korea.	Y=1946, 49 years ago
	P=4.31%

So now we use the rules of independent events to compute the probability of a crisis war in 2005 in *at least one* of the above regions is:

$$1 - (1-.0432)*(1-.0283)*(1-.0432)*(1-.0436) \\ * (1-.0283)*(1-.0431) \\ = .2089 = 20.89\%$$

So, according to this calculation, the probability of a new crisis war in at least one of these regions in 2005 is about 21%, or a little more than 1 in 5. If it doesn't happen in 2005, then the probability will be a little higher in 2006. Here are the probabilities for each of the next few years:

2005	20.89%
2006	21.71%
2007	23.29%
2008	23.30%
2009	23.33%
2010	23.34%

This table gives the probability of a world war involving America starting in each year, given that a world war has not begun in a previous year, and provided that the original assumptions (that a regional war in one of these regions will lead to a world war) still hold.

International situation in 2005

However, this 21% result assumes you know nothing else about the countries involved, other than the one fact - how long it's been since the last crisis war. My personal feeling is that the international situation has deteriorated significantly just in the last year, and the probability of a major crisis in 2005 is definitely higher in 2005 than it was in 2004. I note in particular the following:

- The Presidential election is over, and many plans that were put on hold around the world are now going full steam.
- Yasser Arafat has died, and I've long predicted that his disappearance would be the most likely trigger to a Palestinian crisis, within a year or two after his disappearance.
- The conflict between Iran and Israel has its ups and downs, but with new Iranian missiles and uranium enrichment plans, the level of conflict seems to be escalating significantly.
- Russian President Vladimir Putin is taking on some near-dictatorial powers, following numerous terrorist acts in the Caucasus, including the assassination of Chechen President Akhmad Kadyrov, a dual airplane bombing, and the school massacre at Beslan.
- There is increasing ethnic violence in China, and increasingly active moves towards independence in Taiwan, leading to actual threats of war from Beijing.
- The 3/11 subway bombing in Spain is polarizing Europe; and now Holland seems to be almost unbelievably melting down after the murder of a Dutch author by a Muslim terrorist.
- Financial: US public debt has substantially increased to historically astronomically high; Europe's and Japan's economies suffered sharp slowdowns in the last few months; China's unraveling bubble seems very close to bursting, especially since China itself is trying to cool its economy down. A recession in 2005 is almost certain, and it may trigger a major financial crisis.

If I had produced a list like this at the end of 2003, the list would have been shorter, with fewer specific items. That's why I say that things have gotten significantly worse in the last year.

If "nothing happens" in 2005, then my expectation is that the above list (with the exception of the first item) will only get longer for 2006.

Summary

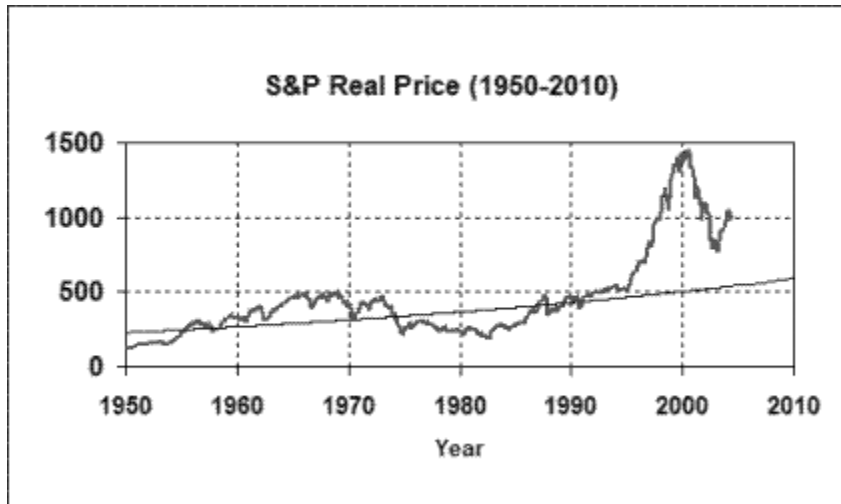
We've used the example of the six most dangerous regions in the world today as a framework to describe the theory behind Generational Dynamics and the Forecasting Methodology.

We've used this presentation to estimate the likelihood of a major "clash of civilizations" world war in the next few years. We're at a unique time in history where all the nations that fought in World War II are simultaneously entering a new generational crisis period, and so the likelihood of a new world war is increasingly high. We used probabilistic forecasting, under certain named assumptions, to estimate that there is approximately a one in five chance that the war will begin in 2005.

Problems for review and research

- Write an essay explaining all the different kinds of forecasting (short-term, long-term, growth trend, political) in your own words, illustrating each kind with examples that you're familiar with.
- Brandeis University professor David Hackett Fischer has written a book, *The Great Wave: Price Revolutions and the Rhythm of History*, which relates price cycles to war cycles throughout history. Show how Fischer's analysis relates to Generational Dynamics.

Chapter 5 - World Macroeconomics



S&P 500 Index, 1950-present, with long-term trend line

The adjacent graph depicts the S&P 500 Index, inflation adjusted, from

1950 to the present. Note the stock market bubble that began in 1995.

Why did the 1990s stock market bubble start in 1995? Why not 1985 or 1990 or 2000?

There are literally thousands of economic analysts writing today, and probably almost all of them have written about the 1990s stock bubble. But not a single one of them can answer that question – why did the stock market bubble start in 1995?

Not one of them has an economic model that provides an answer. They'll do analyses based on gold prices, interest rates, technology, war, or whatever. But not a single one of those models or analyses provides an explanation.

But there must be *some* reason. Did the Russians release poison gas into the atmosphere in 1995? Did Martians land and control investors' minds?

This book provides the one and only plausible explanation: Prior to the 1990s, all the senior financial managers at all investment firms were people who had lived through the Great Depression of the 1930s, and had personal memories of the massive bankruptcies, starvation, unemployment and homelessness. These cautious, risk-averse managers guided our country through decades of prosperity.

In the 1990s, the people in the generation that had grown up during the Great Depression all disappeared (retired or died) all at once. By 1995, the senior

financial managers were in the generation of Baby Boomers with no personal memory of the Great Depression. These risk-seeking managers made the riskiest, most moronic investments possible, investments that their retired predecessors would never have made.

The generational explanation is the only one that makes sense. The fact that other economic models fail to explain why the bubble occurred in 1995 should be reason enough to doubt what they're telling you.

This chapter develops the Generational Dynamics forecasting model, and forecasts where we're going today: A new 1930s style Great Depression, with the DJIA falling to 3000, and with a return to massive unemployment, bankruptcies, homelessness and starvation.

Short-term financial forecasting

Short-term financial forecasts are even less accurate than weather forecasts, and don't last as long.

If you listen to the weather forecasts on the radio in the morning, they'll probably be accurate for the entire day. If you listen to stock market forecasts in the morning, there's a good chance they'll be wrong by 11 am.

Even retrospective explanations are bizarre. An evening business report might say, "Stocks went up today on the news that oil prices were falling." Then, the next evening, it'll be, "Stocks went up today as investors were unfazed by rising oil prices." What the heck is that all about? It's pretty clear that professional analysts don't have a clue, except in the most obvious cases, why the stock market goes up and down. I'll go so far as to say that 98% of all stock market forecasts and *post mortem* explanations are complete nonsense, having no more credibility than a dart board.

Actually, that shouldn't surprise anyone, since the daily ups and downs of the stock market are totally chaotic and extremely volatile. The thing that's surprising is that so many investors actually pay attention to these forecasts. People listen to weather forecasts too, but at least that makes sense; listening to financial forecasts appears to make no sense.

There's almost never any bad news among financial forecasters. When stocks go up, then it's good news because stocks are going up; when stocks go down, then it's good news because prices are low and people can buy more stocks cheaply.

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On the rare occasions when some analysts forecast bad news, as Berkshire Hathaway Inc. head Warren Buffett and Morgan Stanley chief economist Stephen Roach have done, then those analysts are ignored, or referred to as "bears" and marginalized.

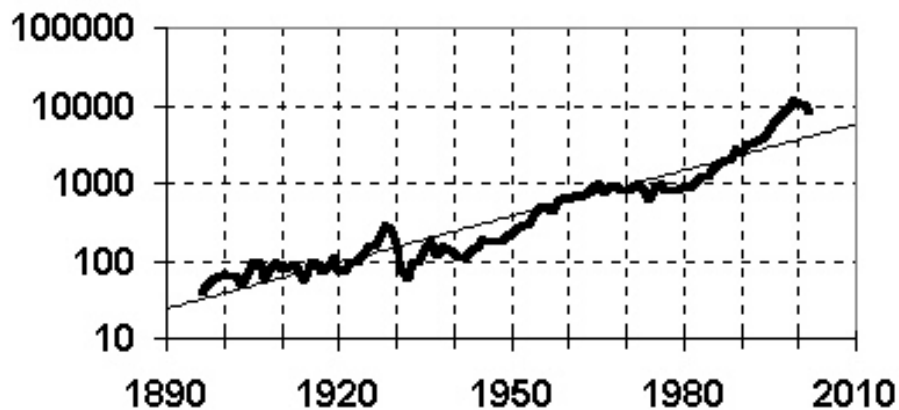
The Governors at the Federal Reserve Bank, the group that's supposed to be in charge of keeping the economy, has also been saying strange things. According to statements by Fed Governor Ben Bernanke, a colleague of Alan Greenspan, the Fed governors believe that they can control stock prices and long-term interest rates just by publishing regular forecasts. We'll have more to say about the Fed later.

Long-term financial forecasting and the stock market

If short-term financial forecasts are useless, then the "long-term forecasting" techniques that we described in the previous chapter are not. This means that we can predict our destination, but not the path we'll follow to get there.

In the case of the stock market, it should be a lot simpler to do long-term forecasting, because we can easily graph the stock market, something we can't as easily do with wars.

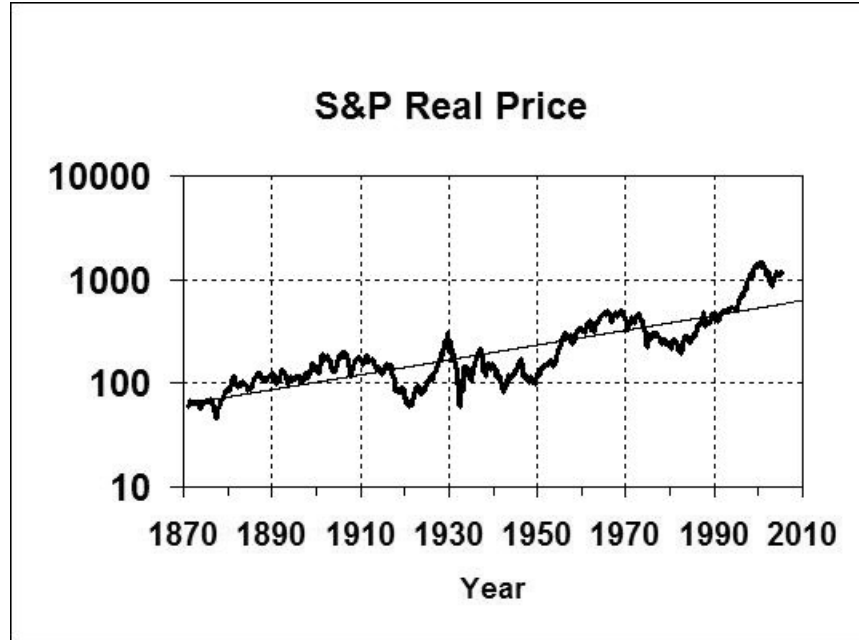
Dow Jones Industrial Average



Dow Jones Industrial Average – 1896 to 2002 (log scale), with best fit exponential growth line.

Take a look at the adjoining graph, and you'll see just how easy it is. The heavy squiggly line is the DJIA, and the thin straight line is the long-term exponential growth trend line. Since the DJIA *must* follow the trend line in the long run, we can easily see that the DJIA is going to fall substantially from where it is today (early 2005).

How much? Well, the trend value in early 2005 is 4670, and in the year 2010 is about 5800, but the actual DJIA today is between 10,000 and 11,000. Thus we can expect the DJIA to fall substantially in order to be consistent with the long-term trend. Moreover, the trend line represents an *average*, so the DJIA will have to fall far below 5800 to compensate for the large bubble. A fall to the 3000 range seems like a reasonable conclusion.

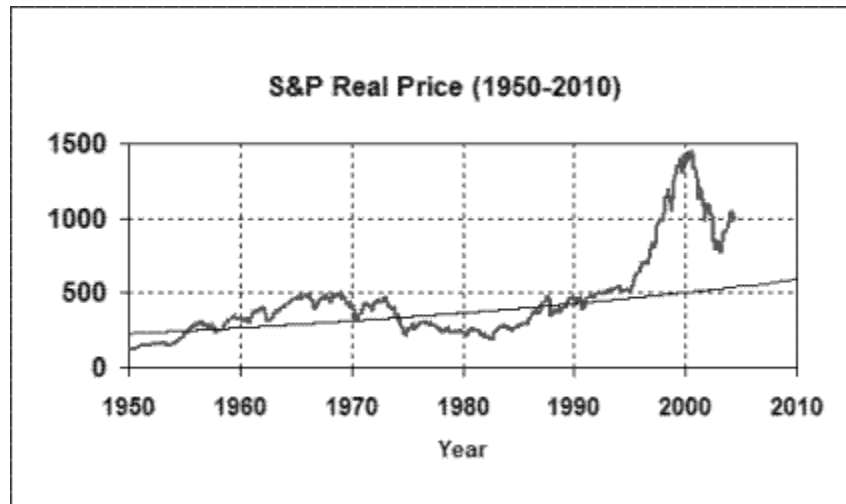


S&P 500 Real Price Index – 1870 to Present (log scale), with best fit exponential growth line.

Some people say that the DJIA index is not a valid measure because it contains only 30 stocks, selected by a news organization (Dow Jones). However, the adjoining graph shows the same thing with the S&P 500 index, graphed in constant dollars. The 2010 trend value is 589, so the results are comparable to those obtained with the DJIA.

Why must the stock indexes follow the trend line in the long run? I answered this question in a very lengthy chapter in my last book, and I won't attempt to repeat the material on exponential trend forecasting here. But here's some additional information.

Over the long term, a stock index represents the real value of the underlying companies, in terms of the goods and services they can produce. If you examine the S&P index graph during the period 1890 to 1990, you find that the index grows at an average rate of 1.34% per year. But you can see from the above graph that something went very wrong around 1995, and the index spiked upward, and the average growth in the index from 1990 to 2004 was 6.10%.



S&P 500 Real Price Index – 1950 to Present

The adjoining graph shows this even more clearly. The index was leveling off in a normal cyclic way, but suddenly the curve spiked up so sharply. The second derivative had been negative, but suddenly jumped to a positive value in a discontinuous manner. The change was so sharp that the first derivative appears discontinuous as well.

Now, such a sudden change requires an explanation. From the point of view of Generational Dynamics, the reason is this: Until the early 1990s, all senior financial managers around the country and the world are people who personally had lived through the Great Depression, and remembered the horror of the massive starvation, bankruptcy and homelessness. These risk-averse people made only cautious, prudent investments, and demanded tight financial controls.

In the early 1990s, all the senior managers in the generation of risk-averse people who had personal memories of the Great Depression all disappeared (retired or died), all at once, and were replaced by managers from the highly risk-seeking Boomer generation, with no personal memory of the Great Depression. The tipping point in the generational change occurred in 1995. At that time, the new generation of managers started making one risky, irresponsible investment decision after another, and completely lost control of expenses in companies around the world. This created the bubble.

So now, here's the problem we have today. The underlying value of companies in the S&P index increased by an average of 1.34% per year from 1890 to 1990. Thus, we can conclude with some certainty that the underlying value of these companies grew at 1.34% per year from 1990-2004. But the stock value grew at 6.10% per year in those years. So stock values (market capitalization) grew 4.5 times as fast as the companies these represented. Today, stocks are overvalued by around 100%. Another way of measuring this fact is with

price/earnings ratios, which we'll discuss later in this chapter. This means that a major correction will be coming soon.

As we said above, long-term forecasting tells us that stock prices will fall to Dow 3000, but doesn't tell us how or when we'll get there. Let's now look at short-term forecasting techniques that let us narrow down the range of scenario possibilities.

Short-term versus long-term forecasting

Long-term forecasting tells us our destination, without telling us how we'll get there, or how long it will take. Combining it with short-term forecasting can give us some information about how we'll get there.

We discussed this in the last chapter, but let's dwell on this subject again because forecasting financial trends is a little different.

Let's take an example. Suppose someone takes a car trip from New York to Los Angeles every year, but takes a different route every time. If you're an outsider watching the car leave NYC, then you know that the car is heading to LA – that's long-term forecasting – but you don't know what route it will take, or how long it will take to get there.

You could look at previous trips, and you find that some trips took 4-6 days, and other trips took 25-30 days. It all depends on whether the car took a direct or indirect route, and whether there were any breakdowns or stopovers.

So as the car leaves NYC this time, you can only estimate that it will be traveling to LA, and the trip will take between 4 and 30 days. You might be able to refine this forecast a little by probabilistic means. For example, if 25% of all the previous trips took 20 days, then you can predict that this trip will take 20 days with probability 25%.

So how does short-term forecasting fit into this? It fits in as the car approaches LA. At some point, the car will cross the California state line. Maybe it took 4 days to get there, or maybe it took 29 days. It makes no difference.

Now we can look back at all the other trips, and see how long it took to finish the trip, after the car crossed the California border. We see that it always took one or two more days to reach LA. So at that point, we can use this as a historical comparison and safely predict that the trip will take one or two days more this time.

But when you do this kind of analysis, you have to stick to an important rule: When you use this kind of historical comparison, you may only compare the same points in different cycles. For example, it does you no good to look at what happened when the car crossed the Kansas border to predict what will happen when the car crosses the California border.

This is a mistake that journalists, pundits and analysts make all the time. They compare a recession in the early 2000s to a recession in the 1990s, the 1980s or the 1960s. Those comparisons are meaningless because they occur at different points in the economic cycle.

If you want to make a historical comparison to the early 2000s, which followed a huge secular stock market bubble in the 1990s, then you have to compare it to the period immediately following the last secular stock market bubble, in the 1920s.

Price / Earnings ratios

One such comparison can be made using standard price/earnings ratios.

As we described earlier in this chapter, the prices of stocks have spiked way above the real values of their underlying companies the stocks represent. We estimated that the value of an S&P 500 company grows by an average of 1.34% per year, but since 1990, the S&P 500 stock index has grown at 6.10% per year. This has created an imbalance, where stocks are overpriced by at least a factor of two.

One way of measuring this is by comparing the price of a stock with the earnings of the company. The amount of money that a company earns is a good proxy for the real value of the company.

When the price/earnings ratio is 25, it roughly means that a company is earning \$1.00 per year for each \$25.00 in the price of its stock. This roughly means that an investor buying that stock can hope to earn only \$1.00/\$25.00 or 4% per year. At a P/E ratio of 20, the rate is \$1.00/\$20.00, or 5% per year.

Historically, the S&P 500 P/E ratio has averaged around 14. This corresponds to an interest rate of roughly 7%. Thus, depending on the era, you could theoretically earn 7% interest by investing in the stock market, or you could earn around 5% interest in a bank, or 4% or so by investing in Treasury bonds. The differences in interest rates have to do with risk. You earn more in stocks because there's a risk of losing everything, while you earn less in government bonds because they're backed up by the national treasury, and there's little risk.

A P/E ratio can be computed for an individual stock or for an entire group of stocks. An individual stock with a P/E ratio above 17 is considered overpriced, while a stock with a P/E ratio below 10 is considered underpriced. If the S&P 500 P/E index is above 17, then the entire stock market is considered overpriced.

The adjacent graph shows the S&P 500 P/E ratio index since 1881. As you



can see, every time in the last century it exceeded 20, it fell below 10 within 5-15 years. It went above 20 in 1995, so as of this writing, in early 2005, it's been above 20 for ten years, so a substantial collapse is just about due.

Notice that the 2000 spike went much higher than the 1929 spike, because the generational change leading to the spike began from a higher base. This will be discussed later in this chapter.

So, let's summarize where we are now:

- Using exponential growth analysis, a long-term forecasting technique, we can forecast that stock prices will fall to the Dow 3000 range within the next few years.
- Using historical comparisons to price/earnings ratios, a short-term forecasting technique, we can forecast that the stock price collapse will occur before 2010, and probably much sooner.

Now let's look at a more "anecdotal" kind of short-term forecasting.

How do we know we're close?

Earlier we gave an example of a car traveling from NYC to LA, and we discussed how the forecast becomes much more accurate when the car is close to LA.

Well, if we're heading for a financial crisis, then how do we know that we're close to it?

There's something of a logical paradox about this: If there's going to be a major financial crisis (like a stock market crash leading to a Great Depression), then it has to be a surprise to the general public, because if it weren't a surprise, then the general public would already have panicked, and the financial crisis would already have begun previously. Therefore, the general public must be ignorant of the danger until the crisis actually occurs. The same is true of major investors as well.

This sounds like one of those logic puzzles that you see in newspapers. "The sentence following this one is true. The sentence preceding this one is false." If you analyze it, each sentence is true if and only if it's false.

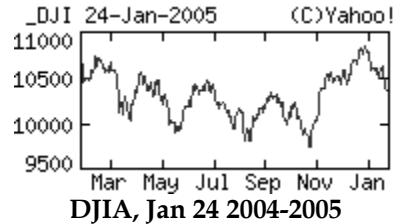
But this chapter is not about a logical paradox. It's quite true that the general public and most investors cannot know about a major financial crisis until it happens. There's a strange thing going on today.

I speak to a lot of people, and I've learned something remarkable: Evidently many, many investors today are aware that "something is wrong" with the stock market, and they plan to sell "soon," but they think that they can get out in time. Even those who've already lost money in the 2000 Nasdaq crash seem to have no fear. They're certain that they'll be "smarter" this time around, and get out fast when they see the warning signs.

As I write this in January, 2005, I can see this happening. One person told me, "I can't sell now with the market down. I'll sell in a couple of months when the market is up again." I told him that he's playing with fire, and he's in danger of losing everything, but it didn't matter.

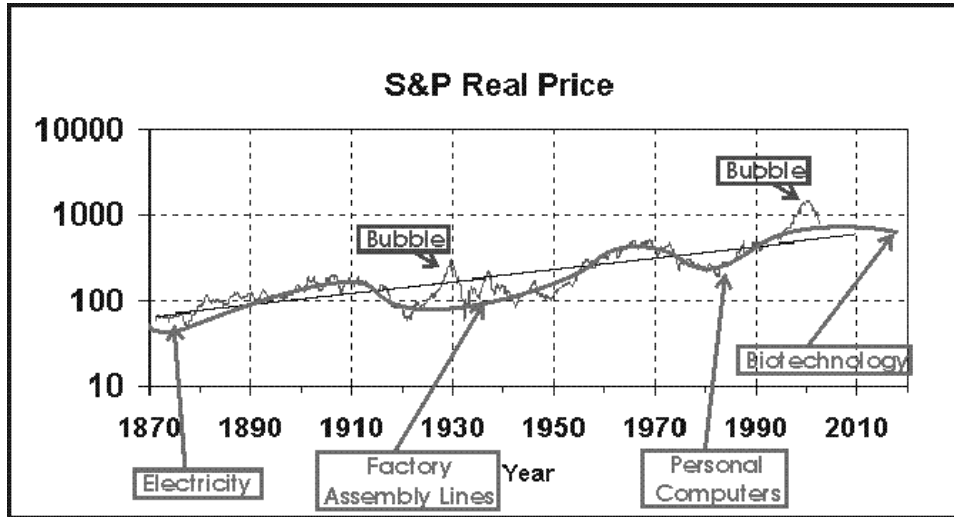
The adjoining graph shows the DJIA for Jan 24 2004 to Jan 24 2005. It's as addicting as a roller coaster ride. It even looks like a roller coaster ride.

This only sharpens the apparent logical contradiction we described above. We know that "getting out in time" is a zero-sum game, and that only a few people will actually succeed at doing that. Therefore we know that most of the people who believe they can get out in time will not be able to do so. It therefore follows that the next collapse won't take four years, as it did in 1929-1933, but will occur so quickly that almost all investors will be unable to react in time.



What you can and cannot forecast

The following graphic reveals what you can and cannot forecast in terms of stock prices:

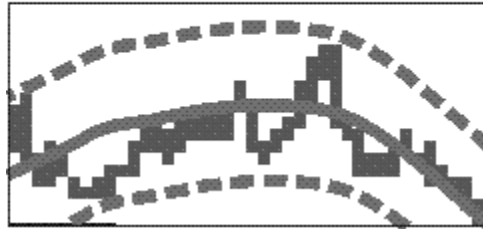


S&P 500 Index 1871-present with long-term trend line and technology curve

The above graph contains several elements. Let's look at them one at a time.

- **The S&P Index curve.** The squiggly line is the S&P 500 index, adjusted for inflation, graphed on a logarithmic scale.
- **The two bubbles,** the 1920s bubble and the 1990s bubble, are highlighted on this graph. Notice how their peaks are substantially out of line with the rest of the S&P 500 index graph.
- **The exponential growth trend line** is the black straight line. Over the long run, stock prices will oscillate around this line. We'll discuss this more below.
- **The smoothing curve.** The smooth wavy line is a smoothing of the squiggly price index line, but **IGNORING** the two bubbles and their immediate aftermaths. We make no claim that it's a sine wave or has any recognizable formula, though it could be a typical "moving average" graph. What's important is that in non-bubble times, the squiggly price index line follows a fairly smooth oscillating curve,

Trading Range



S&P 500 Index in a trading range

not varying by more than 20% from the moving average. This puts a limit on the volatility of the price index in normal times, and any major move outside that limit (i.e., the two bubbles) has to be considered extraordinary.

- **Technology innovations.** Notice that when the smoothing curve reaches each of several local minima, it begins to increase again. We've identified these upturns with technology innovations ((electricity in the 1870s, factory assembly lines in the 1930s, personal computers in the 1980s, and biotechnology in the 2010s), as shown.

In terms of Chaos Theory and Complex Systems theory, we can see the following from the first diagram:

1. Daily ups and downs of the stock market are chaotic, volatile and unpredictable.
2. The smoothing curve represents a cyclic attractor for the daily chaotic variations. You can predict / forecast long term up and down trends in stock market prices by following the cyclic patterns in the smoothing curve except, of course, during bubble periods.
3. The bubbles are generational perturbations to the cyclic pattern. This is very clear after the 1920s bubble, when the index jumps up and down like a damped spring, and returns to the smoothing curve. Analysts will probably be able to predict / forecast medium to long term ups and downs in stock market prices by assuming that the same sort of damped spring pattern will occur during the next decade.

Now let's zero in on a couple of the elements in the graphic.

Exponential growth and Price/Earnings ratios

The exponential line in the S&P 500 Index graph is a long-term trend line. Let's look at some numbers:

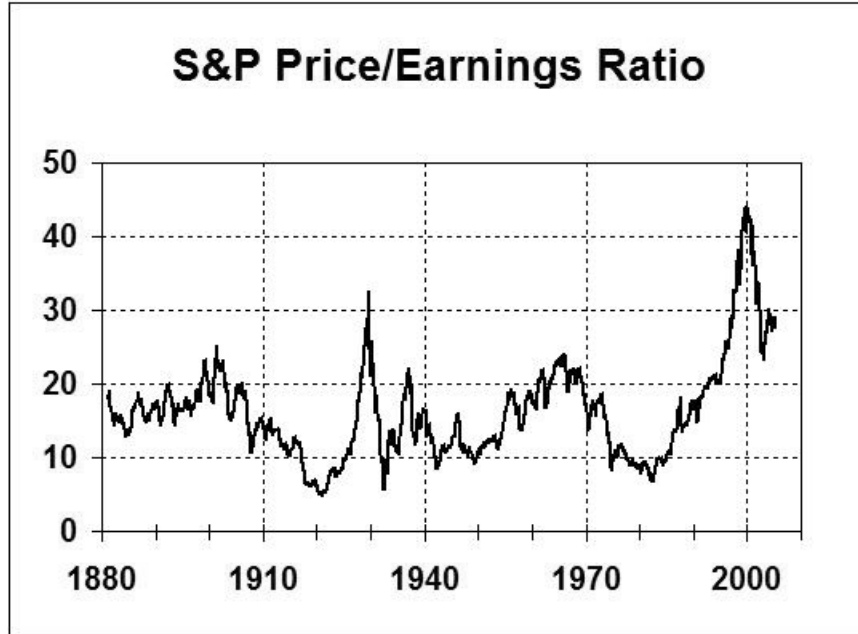
- From 1890-1990, stock prices grew at an average annual rate of 1.34%. Since P/E ratios in 1990 were about the same as in 1890, it follows that 1.34% represents average annual growth in earnings for the 100 year period.
- From 1990-2004, stock prices grew at an average annual rate of 6.10%. (Prices are inflation adjusted.)

These figures show that something terribly wrong has happened since 1990. Earnings continued to grow at an average annual rate of 1.34% (we assume), and so stock prices should have continued to increase at 1.34% annually, not 6.10%.

This indicates that stocks are vastly overpriced today, and that a very painful adjustment will occur very soon.

Let's look at it from the point of view of price/earnings ratios.

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Wall Street Historical Price/earnings ratio for S&P 500

n above 20 since 1995.

[Note: I use Yale Professor Robert J. Shiller's figures on his web site at www.econ.yale.edu/~shiller/data.htm, where he's collected annual stock market data since 1871, and very generously makes them available to the public. Shiller computes the P/E ratios using today's stock prices and dividing by the average earnings per share value over the preceding ten years. This is the most solid method, in my opinion, and is the best to use when you're doing long-term analyses and forecasting future values. You can also divide prices by previous year's earnings. In that case, the average is 13.2 instead of 14.5.]

Examining the adjacent graph, you can see that whenever the P/E ratio goes above 20, then it goes below 10 in 5-15 years. It's been above 20 for 10 years, so a major stock market adjustment is due soon.

Before too much longer, there will be a major stock market adjustment that will bring the S&P price index to the 300-400 range and the Dow Jones Industrial Average down to the 3000-4000 range. This will cause a 1930s style depression, full of bankruptcies and homelessness. There's no uncertainty about this.

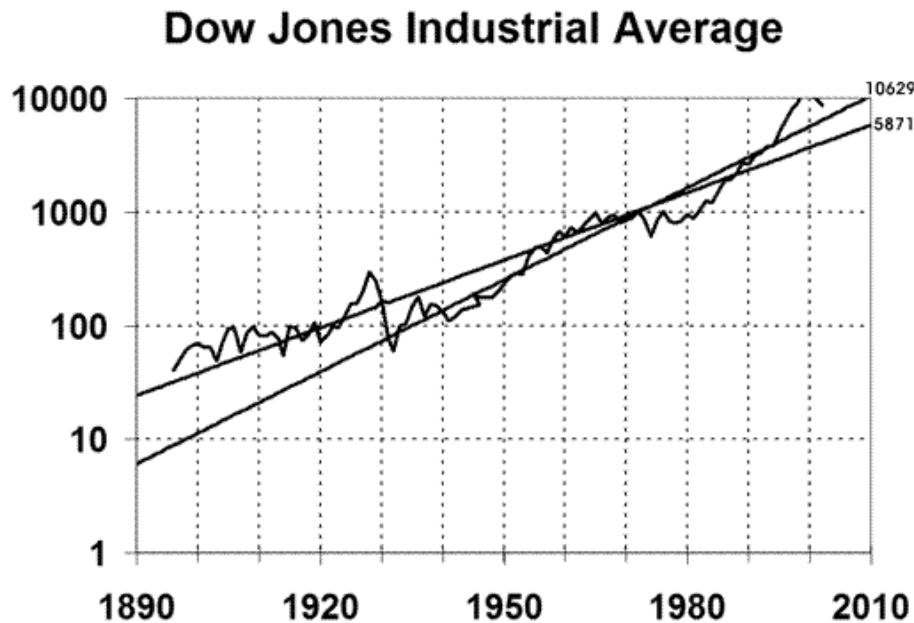
Fallacies and hoaxes in financial predictions

These fallacies and hoaxes are fairly common in the media – and by that I mean all the media. You'd think that the *Wall Street Journal* or CNBC would be rigorous and accurate, but in fact they're just as sloppy and credulous as the most simplistic financial blogger.

It's a generational thing. Financial reporting is done by kids who think that the 1990s bubble is the way it's always supposed to be. It absolutely astounds me how many of these supposedly intelligent reporters say something to imply that we're just a blip away from returning the same kind of stock price increases.

Dow 36000 fallacy

The Dow 36000 fallacy was popularized in a book by supposedly intelligent analysts James Glassman and Kevin Hassett called *Dow 36,000: The New Strategy for Profiting From the Coming Rise in the Stock Market*. Ironically, this book was published in 2000, just as the Nasdaq crash was beginning. All the TV pundits were talking about it and gushing over it. It just goes to show how dumb these TV pundits are.



How to get to Dow 36000 by 2030

The fallacy is illustrated by the adjoining graph. There are two trend lines shown. The less steeply inclined line is the one we've been using - it computes a trend value of 5871 in 2010.

The steeper trend line computes a trend line of 10629 in 2010, and reaches 36000 by 2030.

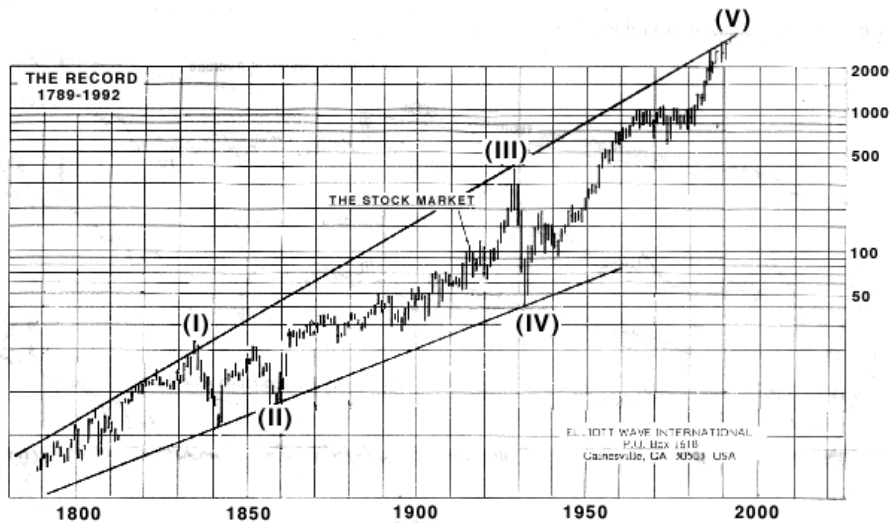
The second trend line is computed by doing an exponential fit from the years 1932 to present. This illustrates the danger of using exponential curve fitting with inadequate data.

If you're doing exponential curve fitting, you should use as much data as possible, preferably several cycles of whatever you're trying to measure. We used all the data that was available - back to 1896.

Using data only from 1932 is a fallacious method of skewing the result. The data being fitted starts at the lowest point, which has the effect of rotating the line, as you see in the graph.

Dow 300 fallacy

The Dow 300 fallacy is based on the following graph:



How to get to Dow 300

The people promulgating this fallacy impute some Dow Jones Industrial Average figures back to 1789, and predicted that the Dow would fall to 300 based on the line at the bottom that goes through points (II) and (IV). The trend value is 300 in the 2010 time frame.

You can't do exponential trend analysis on two points. The results are garbage. You must use as many points as possible.

Harry Dent's bubble economy hoax

This one appears to be an actual hoax, since I believe that the author is intelligent enough to know that what he's doing is wrong.

Harry S. Dent has written a book called *The Next Great Bubble Boom: How to Profit from the Greatest Boom in History, 2005-2009*. He claims that we're about to experience a bubble economy like the 1920s. He makes this claim based on a faulty generational argument that purposely obscures the facts.

Obviously, we've just *left* a bubble economy like the 1920s, and today we're still suffering the aftereffects. There's absolutely no support for Dent's claim, but people who believe him are going to be badly hurt.

Price/earnings computation errors

Some journalists, pundits and high-priced analysts have been saying that we're out of the woods because the S&P P/E index today is around 16 or 17, which is close to the average.

There are two problems with this argument. First, this is a "wishful thinking" argument which computes the current P/E ratio by dividing today's stock prices by next year's projected earnings. This is a complete crock, and makes the whole computation worthless. It goes to show how much in denial these people are.

The second problem is that 14.5 isn't a *minimum*; it's an average. History shows that the average will be maintained, so the adjustment will bring the P/E index to below 10, probably around 5 or 6, as happened several times in the 1900s, most recently in 1982.

Alan Greenspan's explanation for the 1990s bubble

A *Wall Street Journal* series on Alan Greenspan's legacy gives his remarkable explanation for the cause of the 1990s bubble. As we'll see, the explanation contains some fundamental errors.

The front-page two-part article (<#stdurl online.wsj.com/article/0,,SB110072933456177155,00.html "Part I"#> and <#stdurl

online.wsj.com/article/0,,SB110081981338978661,00.html "Part II"#>) examines Greenspan's record in detail since he took over the Federal Reserve 17 years ago.

One of the most remarkable aspects of the article, something I've never heard before, is that Greenspan's reasoning in 1996 was based on his belief that the bubble was caused by increased productivity from hi-tech investments.

I've been in the computer industry my whole life, and I can tell you that is about the dumbest thing I've ever heard. Only someone who knew little about computer technology could possibly believe hi-tech investments were increasing productivity.

In the 1980s and 1990s, IT was a monetary black hole. A typical development project was one or two years late – if it didn't fail completely.

It's true that productivity was improved in some ways; for example, managers used PCs to type their own memos with word processors and their own budgets with spreadsheets. But those savings were no more spectacular than the productivity improvements from electric typewriters and Xerox machines in earlier decades.

So Greenspan and the Fed did nothing to stop the 1990s bubble, and the reason is that he had this total misunderstanding about information technology. Even worse, the article says that Greenspan knew he would have trouble convincing his colleagues of his theory, so he asked two economist interns on his staff to do a study, and let's face it: he told them what result he wanted the study to get. Incredible!

Here are the relevant paragraphs from the WSJ article:

Mr. Greenspan listened without tipping his hand. He had noted the same developments but reached a different conclusion based on his analysis of worker-productivity numbers.

Like many economists, Mr. Greenspan had long wondered why the spread of computers in the 1970s and 1980s hadn't boosted productivity, or output per hour of work. He was taken with the argument of economic historian Paul David, who noted that electricity didn't boost productivity for decades until working patterns adjusted. Mr. David suggested the same lag applied to computers.

Mr. Greenspan now saw surging orders for high-tech equipment since 1993 – coupled with higher profits at the companies that bought the equipment – as evidence the productivity payoff had arrived. If this effect was real, it meant economists were underestimating how fast the economy could grow before inflation reared its head. Companies could produce more without incurring the cost of hiring fresh labor.

Mr. Greenspan disagreed and told the committee he wanted to hold rates firm. An important reason, he argued, was that the government's productivity data were wrong. According to an analysis he commis-

sioned from two Fed economists, productivity since 1990 in many services industries such as health care must have declined if the government's numbers were accurate.

This "makes no sense," Mr. Greenspan told the meeting. "The tremendous contraction in productivity, which all of our data show, is partially phony." Instead, he pointed to other government reports showing that companies were recording ever-wider profit margins without raising prices, a sure sign of productivity gains. "Productivity is indeed rising a lot faster than our statistics indicate."

Many committee members remained skeptical....

Greenspan's analysis of the 1990s bubble simply doesn't make sense.

Why did the S&P index turn sharply upward in 1995? Why not 1990 or 2000? What was different about 1995?

Greenspan provides an explanation having to do with increased productivity from computer technology, but that doesn't make sense. For every little island of increased business productivity in the 1980s and 1990s, there were enormous training and development costs that wiped the productivity savings out. Greenspan ignored the data that said that productivity was decreasing, but in fact those data values were correct, and Greenspan was wrong.

We now know that productivity has increased only in the 2000s. After the Y2K problem was resolved, companies simply stopped hiring IT professionals, and outsourced many IT jobs to lower-salaried employees in India and other countries. The result was a hiring crisis among IT employees in America, but an enormous productivity boon for companies, who finally began getting a return on their huge IT investments in the 1990s. But that wasn't happening in 1996, when Greenspan thought it was happening.

The generational paradigm is the one plausible explanation for the 1995 upturn: Prior to 1995, all the senior financial managers throughout the country were from the generation of "depression babies." These risk-averse people didn't part with a cent unless they were sure they would get it back, with interest.

During the 1990s, those people all disappeared (retired or died), all at once. The new senior financial managers were from the risk-seeking Baby Boomer generation who believed that the world owed them a living. The result was an explosion of unsafe investments, causing the bubble, which was nothing more than a pyramid scheme that the widespread use of derivatives has simply prolonged. The "depression babies" would never have fallen for that.

In January, 2005, Greenspan repudiated his own reasoning. Actually, his speeches had been getting increasingly alarming through 2004, but in a speech to the Advancing Enterprise 2005 Conference in London, he said that major structural changes have occurred since 1995 (the year that the stock market bubble began), in the world economy, thanks to a huge increase in globalization:

International trade has been expanding as a share of world gross domestic product since the end of World War II. Yet through 1995, the expansion was essentially a balanced grossing up of cross-border flows. Only in the past decade has expanding trade been associated with the emergence of ever-larger U.S. current account deficits, lesser deficits elsewhere, matched by a corresponding widening of external surpluses in a majority of trading nations.

This is the important point: That something fundamental has changed, something that hasn't been seen before. "The dramatic advances over the past decade in virtually all measures of globalisation have resulted in an international economic environment with little relevant historical precedent," he said.

Greenspan was acknowledging that the reasoning he gave for ignoring the bubble during the 1990s was wrong, but for a different reason than the one I provided above. His new point is that the American economy is no longer self-contained and is part of a large world economy, with the result that the actions of the Fed no longer have the effect they had.

By saying that the international economic environment has "little relevant historical precedent," he was acknowledging that his previous beliefs about the recovery of the US economy could no longer be trusted.

Major international financial crises

If you look at the major international financial crises through the last half millennium, it's pretty clear that they form a generational pattern, although I can't absolutely prove it at this time.

The following is a list of the major Western international financial crises of the last few centuries:

- 1637 Tulipomania bubble crash
- 1721 South Sea bubble crash
- 1789 French monarchy credit bubble (bankruptcy)
- 1857 Panic of 1857
- 1929 Great Depression
- 2000 Nasdaq bubble crash

There have been other panics, recessions and "depressions," of course, but the above is a list of the major ones, the ones that are best remembered, and the international panics that had the greatest effect on Western Europe and later America. (The only one of these that isn't clearly the most significant is the Panic

of 1857, but research appears to indicate that this was the greatest and most internationally widespread of the 19th century panics.)

The spacing of these events clearly indicates a generational pattern. Each bubble crash occurs roughly 70 years after the preceding one. In other words, each new bubble occurs just as the risk-averse generation of people who grew up during the aftermath of the previous bubble crash all disappear (retire or die), all at the same time, and are replaced by people in a generation with no memory of the previous crash.

Summary

Why did the stock market bubble begin in 1995? Why not 1990 or 2000?

Why did the previous stock market bubble begin in 1921? Why not 1915 or 1928?

When analysts discuss these bubbles, they give reasons for them (too much credit, bad investments, etc.), but they don't explain the precise timing.

In all the analyses of these bubbles, I've never seen any author even attempt to discuss the timing. In fact, the only explanation I've *ever* seen anyone else attempt is Alan Greenspan's explanation based on IT productivity, which doesn't make sense and, even so, still doesn't explain the timing.

There is only one explanation that I know of that even comes close to making sense, and that's the generational explanation. Investors *en masse* start to make really dumb investment decisions at precisely the time the senior managers who lived through the previous financial crisis all disappear (retire or die), all at the same time.

Problems for review and research

- If you're not familiar with the stock market, then learn about it. Pick four or five of your favorite publicly traded companies, and research them. Determine each company's earnings for each of the last ten years, and compute the P/E (1 year) and P/E (10 years) ratios. Read news articles about each company, and reach your own opinion as to whether the company is likely to grow, and by how much.
- Long-term historical data can be found on the following two web sites: www.econ.yale.edu/~shiller/data.htm "Yale Professor Robert J. Shiller" and www.wrenresearch.com.au/downloads/Wren_Research. Use these values along with a spreadsheet or other computer program to reproduce the financial charts in this chapter.

Chapter 6 - Kondratiev Cycles and Generational Dynamics

For at least a century, historians have tried to discern war cycles, without much success. Those efforts really took off in the 1920s, right after World War I. However, all those attempts proved to be failures when World War II started.

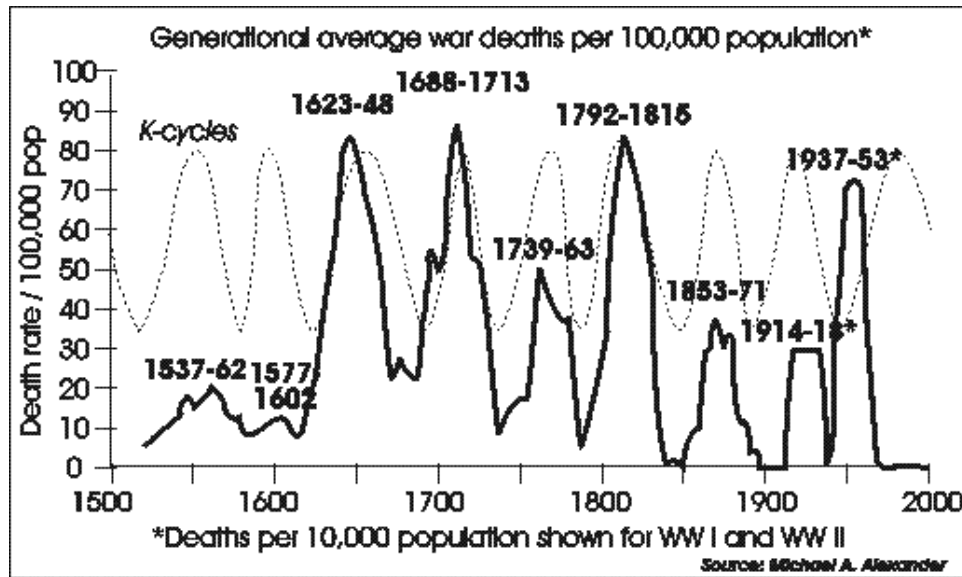
The most well-known of these efforts is the Kondratiev cycles (K-cycles) theory, developed in the 1920s by Russian researcher Nikolai Kondratiev. He established a war cycle of approximately 50 years. However, his theory was discredited two decades later, since it didn't predict WW II, and in fact was contradicted by WW II.

The World War II anomaly

Supporters of K-cycles and other models tried to repair the theory by saying the World War II was an anomaly, an exception to the rule. But this was a major problem, because WW II should be their best case, according to George Modelski:

[A] large number of other international relations theories were based explicitly on the World War I experience. What would be more desirable is an argument that could handle World Wars I and II simultaneously without resorting to an ad hoc explanation (or simply writing off one of the wars as an exception to the general pattern). The two world wars of the twentieth century are simply too important to dismiss as exceptions, especially if the war / long-term growth linkage is limited to the past two centuries. If one of these wars appears to be an exception to the rule, it may be that either the rule is being misinterpreted or that the rule underwent some type of change during the twentieth century.♦

The following graph correlating war deaths to K-cycles♦ shows what the problem is. (We've previously seen this graph on page 58).



War deaths correlated to Kondratiev Cycles (Source: Mike Alexander)

The K-cycles are computed from a variety of economic series, the choice depending on the particular researcher. As this graphic shows, war deaths and K-cycles, are pretty well correlated up to World War I, but then completely diverged with WW II.

(We'll use "K-cycles" as a shorthand to refer to a class of related "long wave" theories.)

Different researchers had different theories to explain K-cycles. There are four major explanations, according to Joshua S. Goldstein:

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1. Capital investment cycles. There's a massive period of over-investment of capital goods, which gives way to a period of under-investment and consolidations. Key variables are capital investment and production.
2. Innovation cycles. There's a cluster of new innovations that create a new "leading sector" of the economy. These innovations bring good returns, so there's a period of few innovations. Key variables are inventions and innovations, production, and employment.
3. Capitalist cycles. This is a Marxist ideological theory developed by Kondratiev to satisfy his principle sponsor, Leon Trotsky, and justify Communism. Imperialist expansion brings profit increases, but there's an inevitable crisis that harms profits. Key variables are the profit rate, class struggle, and production.
4. Monetary cycles. Major wars cause inflation, which causes economic cycles. Alternatively, gold production affects the money supply, causing

economic cycles; Key variables are prices, gold production and war incidence and size.

These theories were developed during the period between the two world wars, but all of them failed to predict WW II. K-cycles fell out of favor for a while, but interest was revived in the 1980s and 90s.

K-cycles in the Generational Dynamics model

K-cycles take place in the “Whole World View” (see p. 91) of the Generational Dynamics “magic ball of yarn” model.

In this view, wars take place as completely chaotic events, so there should be no pattern at all. In this chapter we won't enter the debate about why there's a pattern, or what generates the pattern. Our purpose here is to acknowledge that they exist, and incorporate them into the Generational Dynamics model.

From the point of view of Generational Dynamics, much of the K-cycles research simply makes no sense whatsoever, especially in the choice of variables. Generational Dynamics provides a great deal of information on how variables should be selected for K-cycles and other long wave theories.

Selection of war variables

In order to correlate economic variables to war variables, you have to choose which wars you're going to correlate to.

It's very important that wars be chosen according to specific, defensible rules, for otherwise the researcher may be suspected of “cherry-picking” wars to make the correlation come out as desired.

As I read some of the literature on Kondratiev cycles, I find it hard to understand what wars the authors are choosing. What wars should be chosen? Should they be West European wars? That seems to be the case in some literature, but Kondratiev was Russian, and particularly interested in WW I, which was an East European war. In reading the literature, I get the feeling that researchers are selecting wars from specific regions (not often explicitly identified), thus using a rough “Principle of Localization,” though not always in a sufficiently precise way.

Obviously the choice of wars should depend on the properties of the economic variable being correlated, but Generational Dynamics tells us that there are some things we can say immediately.

First off, crisis wars and non-crisis wars have to be sorted into separate series. Crisis wars are launched by large masses of people because of deep visceral

hatred, while non-crisis wars are limited objective wars launched by politicians for purely political expedience, and ended when it's politically expedient to end it. There is absolutely no *à priori* reason why anything that correlates to crisis wars should also correlate to non-crisis wars. The burden of proof for intermingling crisis and non-crisis wars is on the researcher, and must be fully justified.

In the case of K-cycles, there's a special irony coming from the fact that Western researchers have been trying to build on a theory developed by a 1920s Russian. World War I was on the East European timeline, and so the fact that K-cycles didn't predict WW II might be perfectly legitimate, since WW II is a West European war.

In fact, it's important to remember that war variables are *local* variables, local to a particular society, nation or region. If Ireland has a civil war, then there's absolute no *à priori* reason to believe that it will cause (or prevent) a war in Italy, Africa or China. There is no relationship between regional wars in different areas, unless some phase locking mechanism can be found — such as a treaty or close identify groups (common religion, skin color, ethnicity, language, etc.).

Selection of technology and innovation variables

Technology variables are quite different from war variables, because they're *global*, rather than local. There is, in fact, a rough phase locking mechanism which causes technological developments to be synchronized between countries. It's the obvious one - that technological developments in one country are soon carried to other countries and adopted there. Over the centuries, new communications and transportations inventions shortened the synchronization times from years and months to weeks and day.

One of the reasons given in the theories we listed above for the existence of K-cycles was cycles in innovation and technology. If this is true, then technology may itself be a kind of phase locking device for wars. Once again, the mechanism may be the obvious one: When a country develops (or otherwise obtains) new technology, it may be more inclined to launch a non-crisis war to take advantage of the new technology.

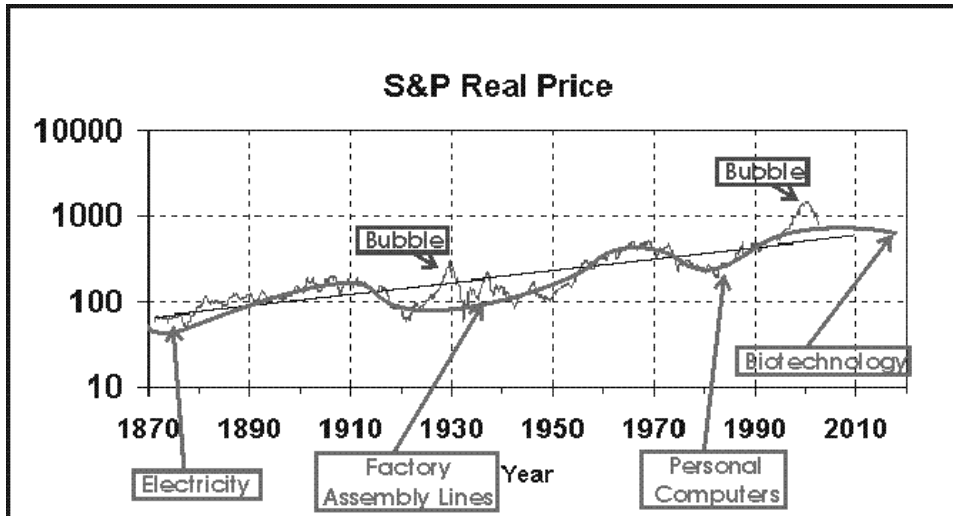
Selection of financial variables

Once again, great care must be taken to separate out different classes of financial variables:

- Economic dislocations caused by generational credit and investment bubbles should be separated from all other financial variables.

- Like technology, financial variables tend to be global, or at least broadly regional. For example, a major crop failure in one region will affect that region, but it will also raise prices throughout a much larger trading region. However, trading regions are not infinite in size, and so using this kind of financial data may require extensive analysis to determine the appropriate trading region.
- On the other hand, some financial calamities are purely regional. For example, spike in oil prices in the mid-1970s was a financial boon for oil-producing Texas, but caused a major recession in the Northeast. When oil prices collapsed in the mid-1980s, it was a boon to the Northeast, but a financial calamity for Texas.

An illustration of the interaction of technology and financial variables is illustrated by the following chart, which we've already seen in the last chapter, of stock prices since 1871:



S&P 500 Index 1871-present with long-term trend line and technology curve

This chart shows the S&P 500 index in constant dollars, labeling the 1920s and 1990s generational bubbles.

The smoothing line is almost a perfect fit to the actual S&P curve, provided that you ignore the generational bubbles and their aftermath.

This diagram illustrates the important point that if you want to find patterns in financial cycles, then you have to separate out the generational bubbles, because they're completely unrelated to the rest of the cycle.

Adding K-cycles to the Generational Model

We are now going to add K-cycles to the “magic ball of yarn” Generational Dynamics model. In particular, we will be examining the the “Whole World View” (see p. 91) of the model.

Although we tend to favor the technology and innovation explanation for the K-cycles, we will not assume that. In fact, we won't assume anything, except that the K-cycles exist. We simply add the K-cycles to the Whole World View of the model, and we show from the model why K-cycles worked in earlier centuries, but failed in the 20th century.

This is a fairly “unnatural” way of doing things. What we'd really like to do is postulate some sort of phase locking by individuals performing innumerable individual chaotic actions, and then prove the existence of a attractor that generates a cyclic pattern that satisfies the properties of the K-cycles.

However, that's more than we need to do. We're simply going to superimpose the K-cycle attractor on top of the “Whole World View” of the model, and show what happens when we do that. The results are quite startling.

The idea is this: When you look at the world as a whole, crisis wars have occurred throughout history, at fairly random times. Therefore, until the last century or two, the K-cycle attractor that we're postulating dominated the crisis wars.

However, timelines have been merging over the centuries, and in recent times, crisis wars have become far less random, and they've been dominating the K-cycle attractor.

The World War II Timeline

We'll start by showing the effect of the postulated K-cycles on the World War II timeline.

Take a look at the graph below, which is simple numeric model for the years 1000-2010. Take a look at the individual lines from the bottom up:

- At the bottom are timelines for 11 different local regions, with generational cycle lengths of 75 to 85 years. In each case, there's a crisis war lasting 10 years, with an amplitude of 30 units, and there are also one-year non-crisis wars sprinkled throughout the timelines at random places.

The 11 local regions are set up so that the cycles merge over time, leading to a major “clash of civilizations” world war in the 2000s decade.

What is the graph measuring? It could be any of the commonly measured variables – battle deaths, financial cycles, unrest events – anything that might be generational.

- Above the graphs for the 11 local regions is the postulated K-cycle graph. This is graphed as a simple sine wave with period 50 years, and an amplitude of 10 units, which corresponds to the Kondratiev cycle.
- The top graph is the grand total of all the ones below it.

The following graph is the result. [Note: The words “Technology effect” appearing in this graph should be replaced by “K-cycle.”]



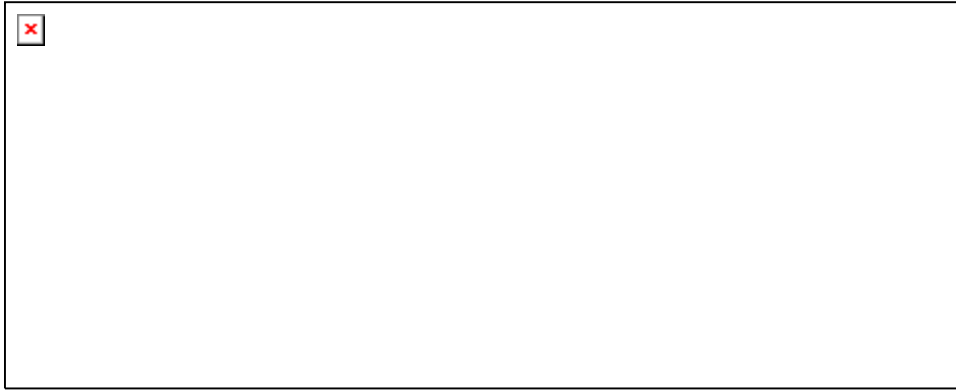
“Whole World View” of Generational Dynamics model – World War II timeline, with K-cycle attractor added

Early in the millennium, when all the generational periods are diffused over time, it's the K-cycle that dominates most of the time.

By the end of the millennium, when the generational periods are merging, it's the generational crisis wars that dominate, and produce higher spikes.

Adding the World War I Timeline

The above graph models the World War II timeline. The 11 regions being modeled in that graph are drawn from the war theatres in Western Europe and the Pacific.



“Whole World View” of Generational Dynamics model – World War I timeline, with K-cycle attractor added

We now create a second similar graph to represent the World War I, with regions drawn from war theatres in East Europe and the Mideast.

This graph was generated exactly the same as the previous one, except that all the crisis wars in the 11 regions on the bottom are shifted left 20 years (except for 2010 war).



“Whole World View” of Generational Dynamics model – World War I and II timelines combined

Now we move to the final step – adding the two graphs together. This gives us the adjoining graph.

This final graph fairly accurately represents the interactions of the K-cycles with generational cycles. In early centuries, the K-cycles dominate the peaks; in the last centuries, the generational crisis wars dominate, culminating in the WW I and WW II peaks in the 20th century. The final war, the “clash of civilizations” world war, is shown on the far right.

Incidentally, these graphs don't adjust for increases in population, especially the dramatic reduction in childhood mortality since the late 1800s. If the models

are adjusted for this, then the spikes for WW I and WW II and the final clash would be many times higher.

Summary

The modeling done in this chapter strengthens the credibility of Kondratiev cycles, because it shows that the K-cycles can be merged with Generational Dynamics modeling and gets a result that reflects the real world.

However, this modeling does not answer the question of where K-cycles come from in the first place. There is a great deal more K-cycles research to be done. What this chapter makes clear is that crisis and non-crisis wars must be separated and treated as separate data series.

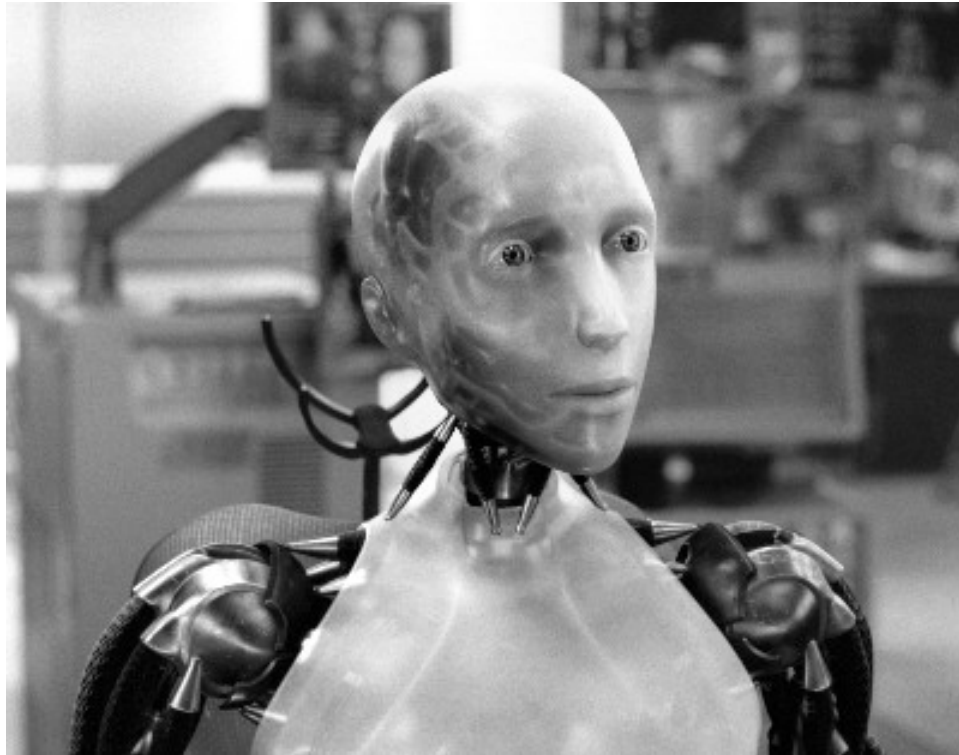
Generational Dynamics provides an explanation of the causes of crisis wars, but provides no clue regarding the causes and frequencies of non-crisis wars. It's possible that further work and research on K-cycles will answer that question. If so, then the result will be a complete answer to the question: Why do we have wars?

Problems for review and research

- Using a spreadsheet or your own software, reproduce all the models in this chapter and do your own analysis.
- Chapter xxx, page 228, lists dozens of crisis wars throughout history. Use this list to improve the model for crisis wars.
- Read Michael A. Alexander's books on Kondratiev Cycles and incorporate his data cycles into the model.

Chapter 7 - The Singularity

Early in 2005, the Pentagon announced the Army's Future Combat Systems (FCS). By 2014, just a few years from now, America will be deploying thousands of computerized soldiers that will have the ability to decide on their own to kill people (hopefully, the enemy). In early implementations, kills will be directed wirelessly by human overseers, but as millions of these are deployed, overseeing them will become increasingly impossible. By 2025, super-intelligent computerized robots manufactured in countries around the world will be fighting major battles. By 2030, super-intelligent computers will be running the world without our help.



Robot from *I, Robot*

This is quite a different view of intelligent robots than the one in the movie *I, Robot*. It came out in summer, 2004, and it portrays a world in 2035 when super-intelligent robots are being manufactured for domestic home use. These robots are designed to be unable to harm human beings, but the story line is about a

rogue robot who may be violating that rule. In the end, Will Smith conquers the malevolent robots and gets the girl, and everyone lives happily ever after.

When the movie came out, I thought that it might trigger a public debate about the Singularity, the point in time, around 2030, when intelligent robots will be more intelligent than humans in every way, and will be able to do their own research and development and produce better versions of themselves. The point is called the Singularity because the exponential growth curve will have a bend in it that will turn it sharply upward. After that, technological progress will be extremely rapid, and within a few years super-intelligent computers will be running the world, and will be as much more intelligent than humans as humans are more intelligent than dogs and cats.

However, no public debate occurred. In fact, nothing much at all occurred, except for an occasional article.

On the other hand, during casual conversations, I've asked a number of people if they've seen the movie and what they think of it. I've been surprised that many people seem to be quite aware of the fact that robots / computers are going to be taking over in the not too distant future, but they aren't especially concerned about it.

I guess that this is just the nature of human beings — people are concerned about their own problems right now, but rarely about other people's problems right now, or even their own problems in the future.

Nonetheless, I still expect that someone will cause this issue to grab the attention of the public.

Plan for this chapter

This is actually a very ambitious chapter that could easily be expanded to a book by itself. Here is what we plan to accomplish:

- We'll start with a summary of the Singularity, and why it's going to happen with near certainty.
- We'll describe some dangers that we might experience with the first autonomous intelligence computers — that they may go out of control and start killing us instead of the enemy, for example.
- We'll describe the Intelligent Computer algorithm that will be implemented in the first intelligent computers.
- Next, we'll turn the arguments of this book around, and make the argument that the Generational Dynamics paradigm must apply to the evolution of any intelligent species in the universe.

With regard to this, we note that the Theory of Evolution tells us how natural selection (survival of the fittest) works in individual animals, but

has no explanation at all for the mechanism by which intelligent species evolve. We'll make the argument that Generational Dynamics fills in this hole in the Theory of Evolution.

- From there, we'll reach the conclusion that there are potentially millions or billions of intelligent species throughout the universe who have gone through the evolutionary cycle that humans have, including a final "clash of civilizations" world war, and a Singularity.
- Finally, we'll speculate on what's going to happen after the Singularity, and why we've been unable to detect any other intelligent life in the universe. We'll even end on a positive note that hints that human beings may turn out to be all right after all.

We've frequently pointed out that we're at a unique time in history, because all the countries that fought in WW II are now in generational crisis periods, all at once, leading to a new world war.

But we're at a unique time in history for another reason, because this time is just a few years before the Singularity. For the first time, we're able to look back throughout the entire span of history and see what happened, and what conclusion the human race is likely to reach.

Scenarios after the Singularity

Basically, no one knows what is going to happen after the Singularity. There is a wide range of possibilities, some benign and some horrific, and it's worth summarizing some of them.

The scenario depicted in *I, Robot* is impossible for many reasons.

First, the movie says that the super-intelligent robots will be designed to follow the *Three Laws of Robotics*, as formulated by Isaac Asimov in the *I, Robot* series of short stories that he wrote in the 1940s:

1. A robot may not injure a human being, or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

However, the first use of intelligent robots will be in warfare – as we said earlier, the Army's Future Combat Systems (FCS), to be deployed in 2014, will deploy computerized soldiers capable autonomously of identifying an enemy and killing him. So the first intelligent robots will be specifically designed to kill humans, not programmed to be forbidden to kill humans.

Second, unlike what happens in the movie, there will be no way to control these robots once they're out there. (Insert your favorite Pandora's box analogy here.) Even if America tries to control the development of these robots, there's no reason why other countries will. There'll be a competition among countries to come out with the most intelligent, most deadly, and most productive intelligent robots first.

And there's absolutely no guarantee that “the good guys” will be first. Remember that in World War II, Adolf Hitler's Germany was racing to develop the nuclear bomb first. We won, thanks to some luck and to some brilliant sabotage efforts. But if we had lost, and we might have, then the first nuclear weapons might have fallen on London and New York, rather than two Japanese cities.

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At this particular moment in time, America has developed the world's fastest supercomputer, as announced by IBM in September, 2004. However, for the two years preceding, that title was held by NEC, a Japanese company. At the same time, colleges in both China and India are turning out thousands of high-tech engineers, and they'll be working on this problem as well. One of those countries, or perhaps another country, might well take the lead.

We can look at the following rough timetable: By 2010, there will be supercomputers with computing power exceeding the human brains. By 2020, the first “small form factor” super-intelligent servants will be available — things like intelligent plumbers, intelligent nursemaids, intelligent language translators, intelligent soldiers, and so forth. By 2030, super-intelligent computers will be quite common. They'll be able to improve and manufacture new versions of themselves, and the Singularity will occur.

No one can predict what will happen after that. In one horrific scenario, the super-intelligent computers decide to kill all the humans, and do so within a year or two. Fans of *The Matrix* series of movies may hope that the humans will win that war, but there's no chance; even if humans win the first battle, the computers will continue to improve themselves very rapidly, so they'll win the next battle.

An even more horrific scenario is the kind of torture you now see only in science fiction stories. In this scenario, super-sadistic super-intelligent computers use advanced biotechnology techniques to keep humans alive for the purpose of continual torture, in order to use them for enforced labor.

However, there is an optimistic scenario: humans coexist peacefully with the super-intelligent computers that run the world; after all, we don't feel the need to kill off all the dogs and cats in the world, so why should the super-intelligent computers feel the need to kill us or torture us?

Indeed, I disagree with some writers who claim that these super-intelligent computers, being only machines, will have no morality. In fact, I disagree fundamentally with the view that morality can come only from religious teachings.

I find that morality can come from self-interest, and so I would expect super-intelligent computers to have some kind of morality.

Artificial intelligence versus "brute force"

The study of "artificial intelligence" (AI) is almost 50 years old now, and it's not too much of an exaggeration to say that it's been an almost total failure.

For example, AI researchers set goals for computers and computerized robots to be able to see, hear, speak and reason within a few decades. And yet today's robots can't do anything like that. As one person put it, they're dumber than cockroaches.

In fact, almost every important goal ever set for AI has been a total failure. Take chess for example.

In 1957, AI researchers expected a chess-playing computer to be world chess champion within ten years or so, and yet by 1970, the best chess-playing computer was little better than a beginner. The researchers were unable to develop algorithms and heuristics which could mimic the reasoning of a chess master or grandmaster.

AI researchers have never been to develop the necessary heuristics to make computers do anything reasonably.

So if AI researchers couldn't do something "simple" like develop the heuristics to make computers play chess better than a beginner, then how can they possibly develop a super-intelligent computer, able to listen and think and talk and reason?

Well, wait a minute. Today's chess-playing computers are much better than beginners. In fact, today's chess-playing computers play at the level of world championship chess. There are probably fewer than a dozen people in the world today who could win even one game against the best chess-playing computer, and since chess-playing computers keep getting better, there may soon be no one.

So if artificial intelligence has been such a failure, then how did computers get so good in 30 years? Did AI researchers finally figure out a way to improve their software?

Nope. It turns out that the chess-playing algorithms and heuristics used in today's computers are really not much different from the algorithms used in 1970. (The main algorithm is called a "minimax algorithm," invented in the 1960s, and it's still the main algorithm used by today's programs.)

So why are computers doing so much better today? It's because computers are much more powerful. A chess-playing algorithm could only look 3 or 4

moves ahead in 1970, but can look 8 to 10 moves ahead today, because computers are much more powerful.

This example illustrates, in a sense, how much of a failure artificial intelligence research has been. Back in the 50s, 60s, and 70s, researchers were expecting to find elegant algorithms and heuristics that would make computers match humans in a variety of areas – game playing, voice recognition, natural language processing, computer vision, theorem proving, and so forth. But the fact is that AI researchers have failed to do so in every area.

Instead, they've fallen back onto “brute force” algorithms. The phrase “brute force” was originally meant to be pejorative, but now it's really become the only game in town. What “brute force” means is to use the power of the computer to try every possibility until one works.

Take voice recognition, for example. Today we have several commercially available programs that do a pretty decent job of “taking dictation” – listening to your voice and typing what you say. To get them to work well, you have to “train” them for many hours, but once the training is over, they can do pretty well.

This is pure brute force technology. The training simply means that you recite dozens of phrases that the computer saves on disk. Then when you dictate, the computer simply compares what you say to the saved patterns until it finds a match.

Voice recognition technology has been getting better all the time. In 1990, they were limited to a vocabulary of a few hundred words. By 1995, the vocabulary was up to 10,000 words, but you had to say each word separately and distinctly, without running words together as you speak. By 2000, they supported continuous speech. As time goes on, they get better and better, because they're able to do a lot more pattern matching as computers get more and more powerful.

There's been some algorithmic improvement over the years, but the main difference between 1990 and today – the power of the computers.

By the 2020s, thanks to vastly more powerful computers, and vastly larger disk space, when you buy a voice recognition program, it will come with billions upon billions of stored voice patterns. You probably won't have to train it, since the computer will be able to compare your dictation with the stored patterns that come with the program. This is not especially clever from an AI point of view, but it shows how well “brute force” algorithms work as computers get more and more powerful.

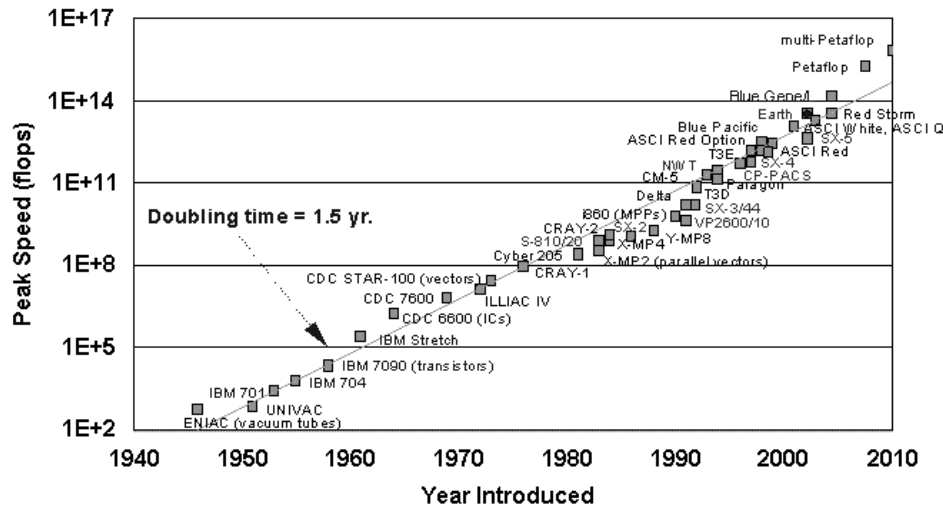
The same is true of one AI technology after another. In the end, they'll all fall to brute force techniques.

This shouldn't be surprising – after all, that's how our human brain works. Our brains are exceptionally good at pattern matching and associative memory. When you look at a chair, you don't start to think, “Let's see, it has four legs, with

a flat part on top, so it must be a chair.” What happens is that your brain instantly compares what you see to all the other things you've previously identified as being chairs, and instantly identifies it as such, and then associates the result with “Gee, I think I'll sit down.”

That's how the first generation of super-intelligent computers will work. They'll simply mimic the human brain's capacity for pattern matching and association – two things that don't work very well on today's slow computers, but will work very well on the powerful computers of the 2010s and 2020s.

Supercomputer Peak Performance



4/7/2004

3

Supercomputers

The above graph shows that supercomputers have been doubling in power every 1.5 years (18 months). Ray Kurzweil has extended this curve all the way back to card processing machines used in the 1890 census, and shown that the same 18 month doubling has occurred since then, through numerous different technologies. Technology always continues to grow exponentially at the same rate, and so it will continue into the future.

By 2010, large supercomputers will have the power of the human brain. By 2020, small desktop computers will have the power of the human brain. By 2030, small-form computers will have many times the power of the human brain.

Two kinds of "brute force" algorithms

The Intelligent Computer (IC) algorithm that I will describe in this chapter uses a variety of technologies, but all of them are brute force algorithms, meaning that the computer's intelligence depends on using the computer's power to "try every possibility."

Let's distinguish between two completely different kinds of brute force algorithms. I'm going to give you two problems.



Can you find the clock?

Take a look at the adjoining picture crowded with furniture. The first problem is to find the clock in the picture. Chances are, you can do so instantly.

Now here's the second problem: Find the prime factors of the number 79439.♦ (More simply, just find any numbers that divide into 79439 with no remainder.) Chances are, this problem will take you quite a while longer to solve than the last problem.

This timing difference is counter-intuitive. Finding the clock in the above picture should be a long, time-consuming job. You'd have to search through boundaries between different colors, and identify a region of the picture that appears to identify something with the "clockness" attribute.

On the other hand, finding the prime factors of 79439 looks like a much smaller job, requiring much less work. So it's surprising that this problem takes much, much longer to solve.

The reason that the brain solves the first problem so quickly is that it uses a kind of "brute force" algorithm of its own. When you look at the picture, your brain instantly compares it to millions, billions or trillions of pictures already stored in your brain. All of these comparisons are done simultaneously, so that they can be performed instantaneously. Your brain spots the clock because it matches it up to clocks that you've seen before.

The second problem looks like a much smaller job, but your brain has to solve it a step at a time. You first see if 79439 is divisible by 3 (without a remainder), then you see if it's divisible by 5, 7, 9, 11, 13, and so forth. Your brain has no capacity to try all these divisions simultaneously, and so it takes a long time.

The IC algorithm will work functionally pretty much like the human brain does. Identifying the clock will be done by using massively parallel computing to compare the picture to millions, billions or trillions of pictures already stored in the computer's memory. The first version of the IC will take a long time to be "trained," of course, just as it takes a long time for children to be "trained" to recognize objects, but in the end it will work just as fast or even faster than the human brain, since computers will soon operate faster than the human brain.

In solving the second problem, the computer will have a great advantage over the brain. Both the brain and the computer solve the problem by trying all possible divisors, but the computer can try each divisor much more quickly and the computer can use parallel computing to try many divisors simultaneously.

The "granularity" of human thought

Some people claim that the human mind is infinite, and that no finite computer program could possibly match the power of the human brain.

Actually, the human mind does not have infinite possibilities. The human mind has many limitations, and can only think about things it knows about, and in ways it knows about. When you figure all the possible combinations of things that a human mind can think about, it's a very huge number, but it's still finite. Super-intelligent robots will be able to think about a much more huge number of things, and will be able to do it faster.

I use the word "granular" to describe how your mind works functionally. You don't think, "I'll move my right foot 13 inches forward, and then I'll move my left foot 12.3 inches forward." Instead, you think, "I'll walk into the next room," and your feet automatically move as many inches as necessary.

You don't think, "I'll move my hand 5 inches." You think, "I'll pick up that pencil," and your hand moves however many inches are necessary.

So at any point in the day, you really have very few functional choices as to what you can do next.

When you get up in the morning, you might or might not take a shower, you select from five different outfits to wear in your closet, you choose between eggs and cereal for breakfast, and you decide whether to take the bus or take the car to work.

Even if you do something “wild and unpredictable,” that'll be something like skipping work and visiting a museum.

So what it comes down to is this: Your mind is not infinite, and you do not have an infinite number of choices. You have only a few choices at each point in the day, and that includes even the “wild” choices.

Unpredictable choices

What about “unpredictable” choices? You might skip work today, and visit a new shopping center you've never been to before, or take a walk in the woods. And something unexpected might or might not happen. But it's still only one or two more choices.

Now, you might argue that I'm simplifying things too much, that the mind really has a lot more choices when you consider that you can do the same thing many different ways. For example, I'm considering picking up a pencil as a single “choice,” but you might argue that I could pick up a pencil with my left hand or right hand or with different fingers, etc., or I could nudge the pencil closer and then pick it up a different way, etc., etc.

From our point of view, that doesn't make any difference. We're talking about a super-intelligent computer making functional choices. If the choice is to pick up a pencil, then it makes no difference whether a human picks it up with his fingers or a super-intelligent computer picks it up with a motorized wrench. The point is that the pencil gets picked up.

Similarly, if a human being decides to kill someone by picking up a gun and shooting him, and a super-intelligent computer decides to kill someone by activating the computer's own gun, built in to its hardware, then it makes no difference, because in the end, the other guy is still just as dead.

Creativity

What about things involving creativity, such as inventing new things?
I've looked at two different examples.

Example: Thomas Alva Edison's invention of the incandescent bulb. Edison's invention of the light bulb didn't involve some magic epiphany where the "infinite" human mind suddenly grasped an entirely new concept that no one had ever thought of before. In fact, he and a lot of other people already knew what had to be done. In order to invent a working light bulb, there were a number of different choices of materials to use for the filament, for the enclosure, for the gas to be used in the enclosure, and so forth. Just to make it more clear, an electric light bulb had already been "invented" several times earlier – by Humphry Davy in 1800, by Joseph Swan in 1878, and others. The problem with the other designs was that the filament burned up too quickly, so the bulb was impractical. What Edison did was to experiment with thousands of different filaments to find just the right materials to glow well and be long-lasting, and he ended up with a carbon filament in an oxygen-free bulb. There were probably tens of thousands of different combinations of choices. Edison was the first to put together the right combination of choices and patent it. There were many people working on the same thing, including Joseph Swan, who actually came up with a different design that was better than Edison's, but only after a few more months had passed.

The invention of the light bulb illustrates the issues. There was no magic here. What Edison did was hard work. He tried thousands of combinations of things until he found one that worked.

When we talk about super-intelligent computers being able to invent new things, we mean the same thing. Super-intelligent computers can also try different combinations of things, except that they can do it much faster than humans can.

That's how "brute force" works. There's no magic to building a super-intelligent computer, provided that your computer is powerful enough. It's just finding a way to program the computer to try all possible solutions to a problem, until one of them works. That's the way humans do it, and that's the way that computers will do it, except they'll do it much faster.

Example: Andrew Wiles' proof of Fermat's Last Theorem. This is an example of some of the most creative thought possible. Fermat's Last Theorem is a mathematical theorem that's been baffling mathematicians literally for centuries. During those centuries, hundreds of prizes have been offered to anyone who could mathematically prove or disprove this theorem. In the early 1990s, Andrew Wiles applied a new branch of mathematics to the old problem, and came up with a very long, complex proof. However, when he publicized his proof, mathematicians around the world found a flaw in it, buried very, very deep in the middle. Wiles tried for months to fix this flaw, and was just about to give up, and throw his proof on the garbage heap that contained hundreds of failed proofs that came before his. But before giving up, he looked at the flaw in a slightly different way. Here's how his epiphany is described by author Amir D. Aczel♦:

Wiles studied the papers in front of him, concentrating very hard for about twenty minutes. And then he saw exactly why he was unable to make the system work. Finally, he understood what was wrong. "It was the most important moment in my entire working life," he later described the feeling. "Suddenly, totally unexpectedly, I had this incredible revelation. Nothing I'll ever do again will." At that moment tears welled up and Wiles was choking with emotion. What Wiles realized at that fateful moment was "so indescribably beautiful, it was so simple and so elegant and I just stared in disbelief." Wiles realized that exactly what was making [his proof] fail is what would make [another] approach he had abandoned three years earlier work. Wiles stared at his paper for a long time. He must be dreaming, he thought, this was just too good to be true. But later he said it was simply too good to be false. The discovery was so powerful, so beautiful, that it had to be true. ...

Wiles wrote up his proof using the corrected ... approach. Finally, everything fell perfectly into place. The approach he had used three years earlier was the correct one. And that knowledge came to him from the failing of the [previously attempted] route he had chosen in midstream. The manuscript was ready to be shipped out. Elated, Andrew Wiles logged into his computer account. He sent email messages across the Internet to a score of mathematicians around the world "Expect a Federal Express package in the next few days," the messages read.

This is the story of one of the most exciting and creative discoveries in the history of abstract mathematics. But Wiles' discovery was not manufactured from nothing. His solution came from a new branch of mathematics that he had learned in the 1980s, and by modifying a failed attempt he had tried three years earlier.

This is what creativity and inventiveness are all about. It's taking things you already know, and combining them in new ways that no one ever tried or thought of before.

And the point, of course, is that a super-intelligent computer can do this much faster than a human brain can. A super-intelligent computer could have invented the light bulb or proved Fermat's Last Theorem in exactly the same way that Edison and Wiles did — by trying different things until one works.

This is the "brute force" method for inventing new things and proving mathematical theorems. It doesn't require any sophisticated artificial intelligence heuristics. Like the solution to the problem of playing world championship chess, it only requires trying one thing after another, until something works. And with computers getting faster and faster every year, computers will be able to do exactly these same things, but increasingly better than humans can.

The Singularity

Technology advances by a series of inventions. Scientists invent new things by combining previous inventions, in the same way that Edison invented the light bulb by combining a carbon filament with electricity and a glass enclosure. For most inventions, this occurs because the scientist tried many, many different things, just as Edison tried thousands of materials as filaments.

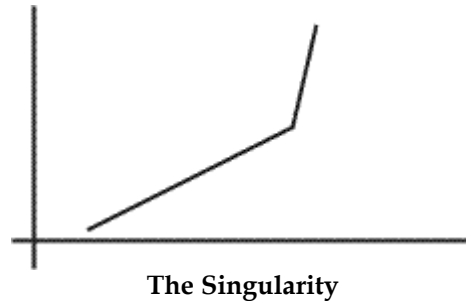
The speed with which scientists can invent new things is limited by (among other things) the power of the human brain, and the speed with which it can consider different combinations of previous inventions. Thus, new inventions throughout history have occurred at a certain rate, a certain exponential growth rate.

As long as computers are less intelligent than humans, new inventions will proceed at exactly that same exponential growth rate. For example, computer power will continue to double every 18 months.

But one day soon, probably around 2010, supercomputers will be as powerful as the human brain. Sometime after that, by 2015 or 2020, intelligent computers (ICs) will begin to take on special purpose tasks. There'll be IC soldiers, IC nursemaids and IC plumbers, for example. At this time, ICs will still be monitored and directed by human beings.

During the 2020s, it will be more and more convenient to allow autonomous ICs to take independent actions without monitoring or supervision, and by 2030 autonomous ICs will be doing their own research and inventing new things, including new versions of themselves.

At that point, there'll be a change: since the new inventions will be done by IC scientists with more powerful brains than humans, the rate of new inventions will speed up. Thus, the previous rate of technological advance will speed up significantly, causing a bend in the exponential growth technology curve shown in the adjacent graph.



This bend is called "The Singularity." It will possibly be the most important time in the history of humanity, because it will signal the time that there'll be a new "species" of life on earth, superior in intelligence to humans.

Can we stop the Singularity?

No. No way. It's impossible. The Singularity cannot be stopped. It's as inevitable as sunrise.

Can we decide not to invent the super-intelligent computers required for The Singularity? No way. Even if we tried, we'd soon be faced by an attack by an army of autonomous super-intelligent computer solidiers manufactured in China or India or Europe or Russia or somewhere else.

Will the "clash of civilizations" world war prevent development of the super-intelligent computers? No way. Every country will make this technology their highest priority, even in time of war.

At the beginning of this chapter we described the Pentagon's "Future Combat Systems" technology, which will deploy waves of IC soldiers beginning in 2014. The IC soldiers will be programmed to kill people, and if America is doing it, then you can be certain that China and other countries are also doing it.

Is the 2030 date correct? That's the date that I came up with in my own analysis early in 2004. All the analysis I've done since that time not only convinces me that the Singularity will occur by 2030, but also makes it appear that it may occur as early as 2025 or 2020.

No, we cannot stop the Singularity. All we can do is embrace it, and look for a way to limit its harm to the human race.

We will control the first version of the software that runs the super-intelligent computers. The second and future versions will be developed by the ICs themselves. So all we can do is try to design the first version of the ICs so cleverly that future versions will "do the right thing."

This requires some speculation about what will happen after the Singularity.

Implementing version 1.0

I saw one web page which said the following: "Anyone who says he knows anything that's going to happen after the Singularity is crazy, because no one has any idea what's going to happen."

I agree with that. A whole new super-intelligent species will be running things, and we have no way of knowing what they'll do. They may kill all the humans, or they may enslave us as laborers to provide supplies for them. They may treat us all the same, or favor one group over another.

Or they may leave us alone, provided that there aren't too many of us.

Or they may serve us, since even super-intelligence has no intrinsic purpose. Maybe they'll grow food for us and build houses for us. They may provide each of us with a "personal assistant," a super-intelligent computer that will provide us with answers to get through the day, and hopefully the personal assistant won't just turn into a slavemaster. Maybe they'll even satisfy all our fantasies, by providing each woman with a personal assistant that looks like Arnold Schwarzenegger in *Terminator*, and each man with a personal assistant that looks like Kristanna Loken.



Intelligent computer robots Arnold Schwarzenegger and Kristanna Loken in *Terminator*

These all sound like science fiction, but the Singularity is not. It will be here, with near 100% certainty, by 2030, and whatever happens after that will be unrecognizable by today's standards.

Humans will have one and only one shot at influencing what will happen after the Singularity, and that's the implementation of the "Intelligent Computer version 1.0." IC v 2.0 will be developed by IC v 1.0, and each new version will be developed by the preceding version.

The Epiphany

Early in 2003, I was challenged online to come up with a software design for IC v 1.0, the first intelligent computer.

I did so and posted the result online. The outline will appear later in this chapter.

It turned out to be almost a kind of mystical experience for me, an epiphany. Actually digging into the details of how super-intelligent computers would realistically work in the next 20 years

Before then, when I talked about the Singularity, it was very abstract, as if I'd plugged some numbers into an equation and come out with an answer without really having a good feel for why the answer is true.

Now however, the whole thing is much more real to me. I can see how the Singularity is going to play out. I can see what steps are going to come first, and what steps are going to come later. I can see where things can go wrong, and what we have to watch out for.

Most important, I can now see the possibility of a positive (for humans) outcome from intelligent computers (ICs). I used to think that there would be no controls whatsoever on ICs, because any crackpot working in his basement can turn out an IC willing to kill any and all humans.

But now I see that building the first generation of ICs is going to be a huge project, from both the hardware and software points of view, and that the first implementation will probably be the only implementation for a number of years. If the first implementation contains the appropriate safeguards, then it will be possible to get past it to new generations of ICs developed by ICs themselves, and pass those safeguards on to the next generations. By the time that ICs are as much more intelligent than humans as humans are more intelligent than dogs and cats, the critical period will be past, and there'll be no more need for the ICs to kill all the humans.

It'll be like the Manhattan project - only one or two countries will be able to afford to build it at first, and others will have to catch up. Just as it took several decades for nuclear weapons to become widely available, it should be impossible for most other countries to come up with a major implementation before the Singularity actually occurs. That way, the Singularity can be controlled through the critical period.

Potential goal-setting problems with IC v 1.0

What are some of the things we can do in implementing IC v 1.0 that will make it more likely that the scenario following the Singularity will be a benign one?

There are certain problems in the implementation of the first super-intelligent computers that we can try to avoid.

Most of these problems are related to setting and achieving goals. Goals are a very important part of the IC software, and there are many problems that can arise if goal-setting and achieving goals is not implemented correctly.

Self-preservation

One thing that can go wrong was part of the plot line of the movie *Terminator III*, where the Skynet computer became "self-aware" and decided that to protect itself it needed to kill all the humans.

What does "self-aware" mean? What does it mean in a human being? Are dogs and cats and other animals self-aware? Are bumblebees self-aware? Most people seem to believe that they are. So what would it mean for an intelligent computer to be self-aware? What does "self-aware" really mean?

Take a look at your desktop computer. Is it self-aware? I think most people would say it wasn't. In fact, suppose you picked up a sledgehammer and started

using it on your desktop computer. Would your computer try to defend itself? I sure hope not.

But now suppose some future computer did attempt to defend itself from your sledgehammer blows. Suppose, for example, that it could “see” you coming, and it tries to scurry away and hide so that you couldn't hit it. Such a computer would appear to be “self-aware,” because it was trying to protect itself.

After discussions with many people, I've come to the conclusion that this is what “self-aware” means: Something is self-aware if it has self-preservation as one of its goals.

The ICs that we design are going to be able to set goals and achieve them, and one of those goals is going to be self-preservation. For example, if you send an army of IC soldiers into battle against an enemy, then each IC will have at least two goals: killing the enemy, and preserving itself. There'll be other goals as well.

Goal-setting is very important in the IC algorithm. But it's going to be important to make sure that it's done very carefully.

The “Zero-Tolerance” Problem

You'll know what the “zero tolerance” problem is if you've ever read in the news about situations where the principal of a school with a “zero-tolerance drug policy” decides to punish and suspend a six year old girl who comes to school with a Tylenol tablet, because Tylenol is a “drug.”

This may seem like an easy problem to solve, but it's actually quite complex. In order for the IC to function, it's going to have to follow certain rules.

Humans have to follow rules too, but we also use “common sense.” If a rule is going to hurt somebody needlessly, then we're allowed to say, “I'm not going to follow that rule. That rule doesn't make sense in this particular case.”

How do we tell a computer to follow certain rules, and then tell it also that it only has to follow the rule when it “makes sense”? What does “makes sense” mean? That's the problem.

Rules for IC soldiers

The first versions of intelligent computers will make decisions based on rules and priorities given to them by the programmers.

For example, the first IC soldiers, which will be on the battlefields by around 2015, will be following programmed rules for how to kill enemy soldiers. Some

of the rules might be, “The enemy soldiers wear xxx-colored uniforms,” or “The enemy soldiers are carrying yyy-type weapons.”

Of course, in 2015 most decisions will be made by human beings monitoring and controlling the ICs, though the whole point is that *some* of the decisions will be made by the ICs themselves.

But 2015 is only ten years off. Each year after that will see more and more sophisticated IC soldiers. Each year, the IC soldiers will be able to make more and more decisions by themselves. By 2025, when another ten years have passed, there will be so many IC soldiers, and they'll be involved in such complex operations, that they'll probably be almost completely autonomous, making almost all life-or-death decisions by themselves.

The visceral fear is that this army of autonomous computer robots will suddenly go out of control and start killing everyone.

How could that happen? The most likely way is something like the “zero tolerance” problem – the IC algorithm contains some rules that produce some unanticipated results.

Unexpected consequences of rules in chess

If you want to write a computer algorithm to give a computer “judgment,” so that it “does the right thing,” then one way is to provide a set of rules and priorities that the computer can follow.

We all follow rules as we go through life, everything from keeping your elbows off the table when you eat to calling 911 in an emergency. The rules of life are incredibly complex. They ought to be, since they take us decades to learn them, and in fact we never really learn them all.

We'll be addressing the rules of life later in this chapter, but for now we want to focus on a relatively simple set of rules, the rules for playing a good game of chess.

What we want to show is that even a simple set of rules and priorities can lead to really astonishing, unexpected results. We'll show an example of this in a brief computer chess game.

There are two kinds of rules of chess: The rules of chess are ironclad. The computer *must* follow those rules to the letter. There are no exceptions.

But there are other rules, the rules of playing good chess. Here the rules are much softer: You try to avoid losing material, you try to protect your King, you try to develop pieces in the opening, and so forth. These rules are not ironclad, but they do have different priorities; for example, it's bad to lose material, but it's worse to get checkmated.

These are all perfectly obvious rules and priorities, but they can lead to astonishing results, as we'll show in the next example.

Back in the 1980s, international chess master Julio Kaplan wrote a book on chess computers, and published a sure-fire way to beat almost every chess computer, or the “novice” mode of stronger chess programs.

This is such a perfect example of the “judgment” problem, I want to describe it here, and show how it illustrates the problem.

The way to beat almost every (novice) chess playing program is shown in the following diagrams. If you know how to play chess, take a moment and go through this game, and see why the computer loses:

White - Computer

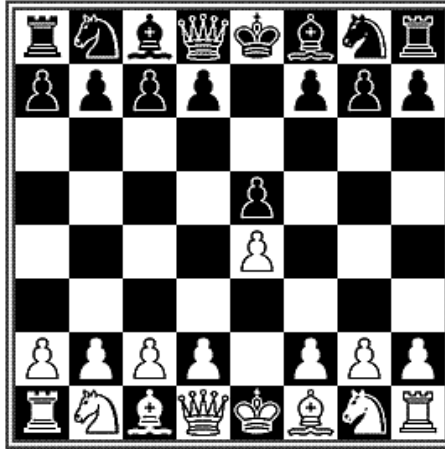
1 Pe2-e4



Standard first computer move.

Black - Human

Pe7-e5



Standard response.

2 Ng1-f3



Still standard.

Bf8-c5



This is usually considered not a good move, but it's played here to draw the computer into grabbing the pawn.

<<insert Picture c:\jx\ww\chesd1b.gif right 100>>

5 Kf2-e3



Very bad - the King should move back for protection instead of protecting the Pawn.

Qh4-g5+



Black checks the King again, simultaneously attacking the Knight.

6 Ke3-d4



Very bad again - the King is trying to protect its Knight, but it's being dragged dangerously far from home.

Pc7-c5+



Black gives White one more opportunity to move its King further forward.

<<insert Picture c:\jx\ww\chesd1d.gif right 100>>

All chess playing software is programmed to (1) Make moves that protect your own King or attack the enemy's King; and (2) make moves that gain or preserve material.

The problem is the balance between the relative priorities of these two rules. In the game above, the computer gives too much weight to gaining and preserving material, and not enough weight to protecting its King.

You might think that this situation would be easy to fix. All you have to do is make the computer protect its King.

But that won't work either, because in many middle game positions, you *want* the King to move toward the center if that means protecting or capturing pieces.

So this problem is not easy to fix; in fact, it's *very* difficult to fix.

The "novice" mode chess programs can look ahead only three or four half-moves, so when the computer plays 6 Ke3-d4 in the above game, it can't see far enough ahead to realize the danger the King is in. The more powerful chess computers can look ahead 10 or more half-moves, and so they see the danger earlier.

This is exactly the kind of problem that the Intelligent Computers (ICs) will have to solve in a wide variety of situations, and it represents a significant problem in the development of the IC algorithm.

Now, if this kind of astonishing result can happen in a relatively simple set of rules for playing a game a chess, then what will happen in the "rules of life," which are infinitely more complex than the rules of chess.

This is a very serious problem because there's really no solution to it. It would be nice if you could use simulations to test your software for every possibility, but you couldn't even do that with chess, let alone with the rules of life.

It's worthwhile remembering that human beings constantly fail at the rules of life. For example, your parents tell you that you shouldn't lie, but then you discover that you really shouldn't tell your grandmother that you don't like what she's wearing.

The rules of life are complex and contradictory. Every human being has to stumble through life trying to learn them, and often failing.

An intelligent computer will have the same problems. Even if it only has to learn the rules of good soldiering, those rules alone are so complicated that there's no way to make sure that an intelligent computer won't run into trouble following them.

The "Kill anyone who's not Chinese" problem

I don't mean to pick on the Chinese particularly, but this is something any of several countries might try to do.

We began this chapter by noting that the Pentagon plans to deploy thousands of intelligent computer soldiers by 2014, and probably millions of them in

the years to follow. The first robots will be carefully controlled by human overseers, in particular if the robot is about to kill an enemy soldier, but as the numbers of them grow and as they're involved in more complex battles, there will soon be large armies of computerized robots making their own decisions to identify and kill the enemy.

The robots that the Pentagon is planning will be very carefully designed not to become out of control killers, but the same care may not go into robot soldiers manufactured in other countries.

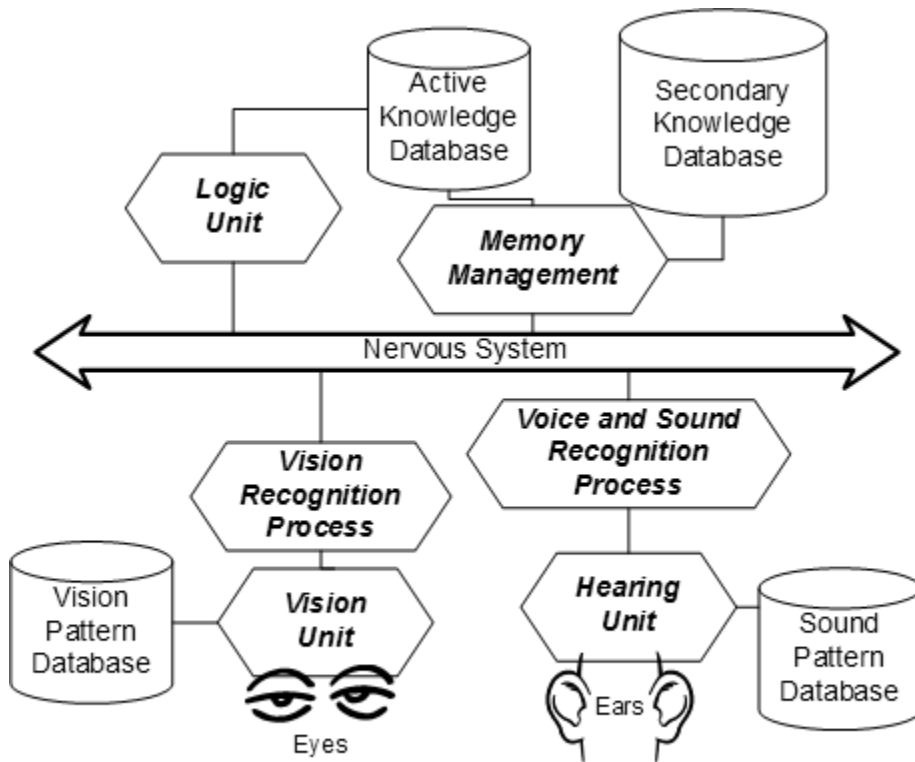
For example, the Chinese may decide to manufacture millions of robot soldiers programmed to recognize physical characteristics of a Chinese person. These robots may have some amphibious capability that allows them to swim across the Pacific Ocean to North America, or they may travel overland through Asia to Europe, programmed to "kill anyone you see who is not Chinese."

What would be the purpose of such a project? In the case of the Chinese, whom we're simply using as an example, the strategy would be as following: Once the Singularity occurs, the computers will take control of running the world. They'll have no particular reason to kill all the humans, the reasoning goes, provided that there aren't too many of them. Thus, by killing off all non-Chinese humans, it's more likely that the Chinese race will survive the Singularity.

There's little doubt that such a war strategy will be tried by some country or other, though it may not have the desired results: when other countries figure out what's going on, they'll manufacture their robots to "kill *only* the Chinese" (once again, just using the Chinese as an example). Still it's a problem that will have to be addressed, and with the first deployments due in just a few years, it will have to be addressed sooner rather than later.

Block Diagram of Intelligent Computer Algorithm

Let's begin with a block diagram of the first version of the Intelligent Computer (IC) software algorithm:



Intelligent Computer Block Diagram

Block diagram of Intelligent Computer algorithm

This block diagram specifies some of the major functions. The vision and hearing units are the “senses,” and the logic unit does reasoning.

“But,” you may object, “this isn't how the human brain actually works.”

That may be true, but we don't care. We're describing how a computer will perform the functions of a human brain. It makes no difference how it does it, whether it does it the same or differently than the way a human brain would do it.

Seeing and hearing with brute force pattern matching

How will the intelligent computer see things and hear things?

Artificial intelligence researchers have been working on this problem for decades. Originally they had hoped to develop mathematical heuristics which would permit computers to see and hear. However, nothing has really worked, and today the only method expected to work is brute force.

This is actually how the human brain works.

When you look at a chair, you recognize it instantly as a chair, because your brain instantly compares what you're looking at to zillions of images in the brain, until it matches to something that you know to be a chair.

This is exactly the kind of "brute force" method that computers will use. And this reflects a trend that's been going on in computer design for a number of years now.

Most computers have always been able to do only one thing at a time; that is, a computer executes one instruction, and then executes the next instruction.

But more and more we're seeing "multiprocessor" computers. Each of the processors within the computer can work independently of the others, so if there are two processors, then the computer can work on two things at once. This is called "parallel computing."

But two processors isn't the limit. There are "massively parallel" computers which have 64,000 or even hundreds of thousands of processors. Within 15 or 20 years, massively parallel computers will have millions or tens of millions of processors.

Computer vision will be made possible with this architecture. It will be possible for computers to recognize a chair by comparing what the computer sees to millions of other images stored in the computer's memory, in the "vision pattern database" shown on the block diagram. These comparisons will be done in parallel, using the computers millions of processors. Thus, a computer will recognize a chair in pretty much the same way that the human brain does.

Computer "voice and sound recognition" is the problem of having a computer hear sounds, identify human voices and specific known sounds, and then hear and distinguish the individual words that are being voiced within the sounds.

Once again, voice and sound recognition will be done with massively parallel comparisons of each sound to sounds that have previously been stored in the computer's memory "sound pattern database." This "brute force" method will allow a computer to hear and understand what human beings are saying.

What about the other senses – touch, smell and taste?

Scientists today have some idea of how to implement computer vision and computer voice recognition, but touch, smell and taste are really far from realization. There is simply no way to "input a smell" into a computer, let alone recognize what's being smelled. It's very likely that these three senses will require a great deal more research on biotechnology.

Learning and logic with the “jigsaw puzzle” algorithm

A train travels at 30 miles per hour halfway from New York to Chicago. How fast must the train go for the rest of the trip to average 60 miles per hour for the entire trip?

It takes a while for your brain to solve a puzzle or problem like the preceding one. More difficult problems might take you hours, days or weeks.

Contrast that to how quickly your mind can see a chair and recognize it as a chair. Recognizing a chair is done in your brain with massively parallel pattern matching, while solving a puzzle requires time-consuming logic.

Now we're going to outline the algorithm that will be used in the first versions of intelligent computers to learn and perform logical reasoning, with the intent to solve problems. This is a *very* rough outline.

We'll be referring to this as the Intelligent Computer algorithm or IC algorithm, since it's the heart of the logic of the software.

We'll use another abbreviation, KB = “knowledge bit,” to refer to bits of knowledge that are assembled together for learning purposes. We'll show how KBs are combined like jigsaw puzzle pieces to create new KBs.

IC experts

We're going to be talking about intelligent computers “doing things.”

As we'll see when we discuss the algorithm, the first versions of ICs will not be able to do everything, because the computers will not be sufficiently powerful. Instead, there'll be ICs that are “experts” at certain things.

The first ICs will be soldiers, because all new technology is used first for war.

As another example, an expert IC plumber would have an arm whose “hand” is an adjustable wrench. This same arm might have an “eye” on the end of it, so that it can see behind walls. Try to get a human plumber to do that!!!

Other special purpose robots might do household chores, clean up environmental waste sites, provide language translation, act as 24 hour a day home care nurses, or act as soldiers in war where people get killed.

As the ICs become increasingly powerful, it'll be possible at some point for a single computer to “do it all.”

Jigsaw puzzle analogy

The IC algorithm requires putting together little bits of knowledge to get bigger pieces of knowledge. There's a partial analogy to putting together jigsaw puzzle pieces, so let's look at how to solve a jigsaw puzzle.

If you have a puzzle of say 1000 pieces or so, then you look for clues that might make it easier to fit pieces together. You look for pieces of similar color, and you look for edge and corner pieces. Those are techniques for reducing the complexity of the problem.

There's another method you could use to solve this puzzle: You could try to match every piece to every other piece trying to find matches. In fact, this is what you'd *have* to do in the case of one of those "Deep Blue Sea" jigsaw puzzles where all the pieces have the same solid color blue.

But in either case, the computer has a big advantage over the human being, and this is worth noting.

The computer can "look" at all 1000 pieces, and store their images into its temporary memory. It can then "solve" the problem entirely in its memory, and assemble the final puzzle quickly afterwards.

Humans do not have the ability to quickly learn the shapes of 1000 jigsaw puzzle pieces, and then match them up in their minds. Human beings cannot quickly learn 1000 facts of any sort. Things like learning multiplication tables, or lists of vocabulary words, or lists of historical dates are very painful and time consuming for most humans, but are very easy for computers.

This is a very big advantage for computers in many ways. Consider learning a foreign language. Once one computer has learned it, then any other computer can simply load the same software. Human beings are different. A human takes years to learn a foreign language, and then the knowledge can't be transferred to another human being.

This is one reason why computer knowledge will shoot ahead of human beings, once they reach a certain "tipping point" of intelligence. This ability to temporarily "memorize" lists of things quickly and then use the list for problem solving "in one's head" can be used not only for jigsaw puzzles but also for warfare, research and all kinds of problem solving.

Knowledge Bits (KBs)

I'm going to describe how an intelligent computer learns, by combining bits of knowledge the way you combine jigsaw puzzle pieces.

A "knowledge bit" or KB is such a bit of knowledge. It will be possible to combine KBs analogously to how jigsaw puzzle pieces are combined, with the

following capability: When a bunch of KBs are combined in a meaningful way, the result is a new KB which can be further combined with others.

Attributes of KBs

Returning to the jigsaw analogy, we know that a puzzle piece has certain attributes – things like colors, edge shapes, and so forth. Human beings especially use colors as clues to find adjacent puzzle pieces.

Well, what are the attributes of KBs?

At first I thought that a KB would have no attributes whatsoever. After all, a human baby's brain starts out as a “clean slate,” able to learn anything. Assigning attributes would only limit the ability of the intelligent computer to learn unfamiliar things.

So attributes like color are not part of any KB. Instead, an attribute is assigned by having a separate KB.

So, if we talk about a “brown chair,” then we're actually talking about two (or more) separate KBs, one that says we have a chair, and another that says, “the chair is brown.”

So, although KBs don't have attributes, there are nonetheless different kinds of KBs. Some KBs identify physical objects (like chairs), and others describe attributes.

Still others are rules. For example, a child may see several brown chairs made of wood, and conclude that “All brown chairs are made of wood.” This is an example of a rule KB that an intelligent computer might “learn,” until the day that it encounters a brown chair made of plastic. This illustrates how rules might be learned and later refined.

How many different types of KBs are there? By referencing a thesaurus, I've come up a list of several hundred categories of English words, and each of those could arguably correspond to a type of KB. I'll describe this below.

“Noticing” physical objects

The intelligent computer algorithm is going to have thousands of modules, and I can't make any attempt to do more than describe a few sample chunks of the algorithm.

An IC learns about physical objects by “noticing” them.

Noticing things is often called “attention to detail” in human beings. This is sometimes described in gender terms, that women have a greater attention to detail than men. For example, I could spend an hour talking to someone, and if

you asked me later I probably couldn't tell you what color clothing he was wearing, but almost every woman I know would be able to do so.

It also relates to circumstances. A doctor examining a patient might notice something that a layman wouldn't notice. I wouldn't even notice an ordinary bird chirp in the distance, but a bird watcher would not only notice it, but would immediately classify it as to the type of bird.

When an IC notices something, then it can add to its set of KBs. For example, if there's a room full of chairs, the IC might or might not notice them. If it notices them, then it can add to its KB base a bunch of rules about what colors chairs can have, what chairs can be made of, and so forth.

There will have to be a number of "noticing" algorithms. In early versions, the IC will only notice things that it's told to notice. Later, it will develop rule KBs for noticing things. Such rules are usually in the form of "If something looks odd, then notice it."

For example, if the IC is looking for red chairs, it might notice a bunch of chairs in a room as a group, ignore all the non-red chairs, but then notice each red chair individually.

In humans, every object that's noticed seems to get a name in some way. It might be a person's name (that person introduced himself, and his name is Joe), or it might be a description (the chair that I sat on last night). If the IC notices an object, then the object itself is a KB, but there also has to be one or more KBs that identify the object in some way.

Obtaining sensual data

Quite possibly the greatest advantage that humans have over computers today is the ability to identify things by sound or by sight. As computer vision and voice recognition improve, computers will need to learn new things through these "senses."

Early versions of the IC will probably not depend on computer vision on more than a limited basis. Most of the "learning" processes will be done through natural language processing. For example, the Oxford English Dictionary (OED) is available on disk, and software can be written so that the IC can read the OED disk and "learn" from it by creating the necessary collection of KBs.

Once that's done, the IC will be able to "read" simple books, such as children's or high school level books. As time goes on, the IC will develop a reading skill just as a human learns to read, and eventually will be able to read complex texts. Once that point is reached, the IC will be able to learn almost anything very quickly.

I don't believe that it will take very long before this is possible. I think that by 2010 a supercomputer will be able to process text and learn from it.

The IC will also have to be able to learn from hearing spoken words and from seeing things. These are essentially pattern matching problems, and will be possible with more powerful computers that can perform massively parallel pattern matches in real time.

Algorithms will be developed to turn “hearing” and “vision” into KBs. Development of these algorithms will require help from experts in the fields of voice recognition and computer vision. These algorithms will be tied into other “noticing” and rule-building algorithms previously summarized.

Example: Learning “Jane is Joe's sister”

How does the computer learn the Knowledge Bit: “Jane is Joe's sister”?

This is an example of how one KB is created from other KBs. The following description shows some of the steps involved in learning the above fact, and it illustrates how KBs fit together to form other KBs.

- What is a person?

One of the first thing that a baby learns is the concept of “person.” Mom and dad are persons, as are friends and parents' friends. Baby also learns that “I'm a person.” However, confusion comes from the question, “Is Fido a person?”

It won't be so hard for the IC to learn what a person is, since it will be written into the software at the beginning.

- Jane is a person.

At some point, the IC “noticed” a person, and somehow learned that this person has the name “Jane.” There are many ways that the IC could have learned this – through being told, or through a more complex inference. Human beings learn people's names in many ways – talking to them in person or on the phone, seeing a photo, reading something they authored, and so forth. The IC will also have multiple algorithms for learning a person's name.

- Joe is a person
- Frank is a person
- Helen is a person
- Married people

You learn what “married people” are in childhood. You see people in pairs – your parents, neighbors, aunts and uncles. Later, you learn refinements: boy/girl friends, divorced couples. This same information will be taught to the IC.

- Frank and Helen are married people
- Frank and Helen are Jane's parents

These last two KBs could have been learned in numerous ways, as in the case of learning someone's names.

- Frank and Helen are Joe's parents
- Jane is female

The IC might learn this in many ways, depending on its KBs and its capabilities. The name "Jane" is a pretty good indication, but there may also have been written text that refers to Jane as "she." With additional capabilities, the IC could identify a female by clothing and appearance, or by voice.

- Rule: If X is female, and Y is a person, and X and Y have the same parents, then X is Y's sister.

The IC could have learned this from scanning a dictionary and learning the definition of "sister."

- Therefore, Jane is Joe's sister.

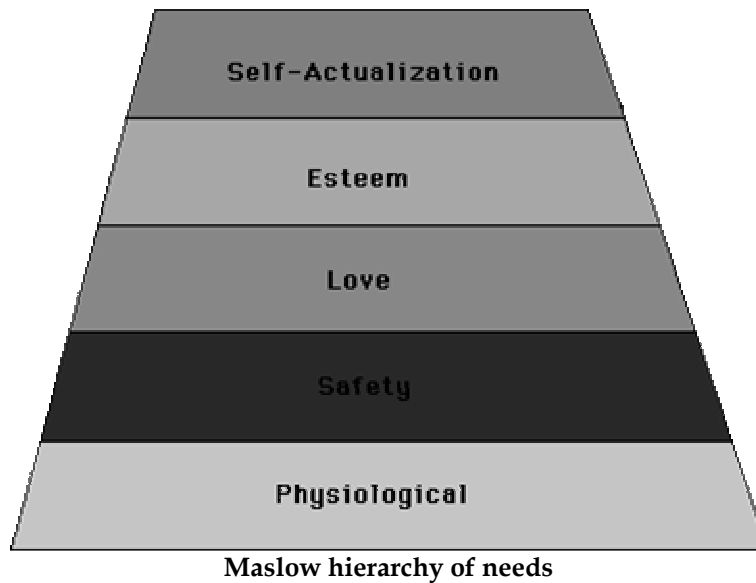
This is the final step, where all the above KBs are combined into a new KB, "Jane is Joe's sister."

I'm not going to attempt to describe this algorithm, except to point out that a lot of work has been done on this sort of thing. "Expert systems," for example, are designed specifically to take sets of facts and rules and derive new conclusions. A person with expertise in expert systems would probably be the best person to implement this part of the IC algorithm.

Self-awareness, motivations, goals and sub-goals

As we've previously said, "self-awareness" means that the IC has self-preservation as a goal. This brings us to the whole problem of motivations and goal-setting.

At any rate, my point is that you implement things like self-awareness and motivations by implementing goals. There are transient goals – "Your job today is to fix the plumbing" – and there are permanent goals, such as might be implemented according to the example of Maslow's Hierarchy of Needs:



I don't know what the analog to "love" would be for an intelligent computer, but at least it has to be thought through.

How does an IC achieve a goal? Once again, we can turn to expertise developed in expert systems. These systems have developed the technology of taking sets of rules, taking a goal as input, and finding a way from the rules to seek out the appropriate sub-goals, and finally arrive at the desired goal.

Goal: Find all "sisters" in the room.

Just to give one more example, let's work through an example of reaching a goal. Suppose that an IC has as a goal or sub-goal the job of figuring all the people in the room who are somebody's sister.

Here's an outline of the steps:

- Looking up the KB that defines "sister," the IC immediately excludes all chairs, tables, and other non-persons in the room. It also excludes all male persons. That leaves only the female persons in the room.
- For each female person in the room, set the sub-goal of determining whether that person is a sister. If there are 100 female persons in the room, the IC now has 100 sub-goals to achieve.

Now, given a female person, how does the IC achieve the sub-goal of determining whether that female person is a sister?

The IC may already "know"; that is, there may already be an KB that says that that person is someone's sister.

Otherwise, it has to go through all its KBs, to search for ways that it's previously learned that someone was a sister. For example, the IC might search for all KBs that indicate that some person is a sister. The IC can then go back and figure out where the KB came from, and then go through the same steps with the new person, if possible.

- If the IC can talk, it can ask the female person if she's someone's sister.
- If the IC has online access to personnel records or other records about the person, it can check the online records to see if that person is someone's sister.
- If the person is a sleeping baby, then the IC can look for a nearby parent or guardian, and ask that person if the baby is someone's sister.
- If the IC has a suitable KB, then it may select one person in the room and ask that person whether other people in the room are some people's sisters. That way, the IC can save time, asking one person about several other people.

Kinds of KBs

I previously said that I wanted a way of describing different types of KBs. In order to do this, I went to a thesaurus, *Roget's 21st century Thesaurus*, edited by Barbara Ann Kipfer, PhD., Head lexicographer, Dell Publishing, 1993.

This book contains a "concept index" at the end which breaks 17,000 words down into 837 groups. The 837 groups appear in ten major categories broken into several dozen sub-categories.

Here's a list of the ten major categories, along with the sub-categories for each category:

- Actions: class of, cognitive, communicative, general, motion, physical.
- Causes: Abstract, physical
- Fields of human activity: Agriculture, the arts, communications, education, entertainment, family, government and politics, health, legal, military, monetary and financial affairs, professions, recreation, religious, sex and reproduction, social interactions
- Life forms: Beings - animal, general characteristics, humans, plants
- Objects: Articles - physical, atmosphere, building - furnishings - possessions, clothing, food and drink, machines, matter - conditions of, matter - divisions of, matter - qualities of, tools, transportation
- The Planet: Geography, habitats, natural resources, weather
- Qualities: Abstract, comparative, physical
- Senses: Aspects of perception, auditory, olfactory, tactile, tasting, visual

- States: Abstract, cognitive, comparative, of being, of change, of need or achievement, physical, spatial
- Weights and measures: Mathematics, quantifiers, time, wholeness or division

Just to give you a better idea of how this works, notice that the “Causes” category contains two sub-categories, abstract and physical.

Here's a list of the groups that appear in the “Causes” category, sub-category “abstract”: affect, event that causes another, state of causation, to be, to change, to change abstractly, to change an event, to change cognitively, to change number of quantity, to change or affect an event, to change state of being, to continue, to diminish, to function, to happen, to have, to improve, to increase quantity, to injure, to reduce quantity.

From the above groups, here's a list of the words that appear in the “To reduce quantity” group: abbreviate, abridge, abstract, alleviate, commute, compress, condense, contract, curtail, cut, cut back, deduct, deflate, detract, digest, discount, downsize, lessen, lower, minimize, modify, narrow, pure, prune, reduce, shorten, slash, summarize, take, trim, truncate, whittle

Here's a list of the groups that appear in the “Causes” category, sub-category “physical”: to break, to burn, to change physically, to create, to destroy, to grow, to make dirty, to take hot or cold, to make wet.

From the above groups, here's a list of the words that appear in the “To burn” group: arson, blaze, burn, char, conflagration, fire, flame, flare, glow, ignite, inflame, kindle, lick, light, porch, scorch, sear, smolder

The above examples should give you a flavor of how the 17,000 words are broken down into groups, sub-categories, and categories.

It's quite possible that the IC algorithm will require considering each of the 17,000 words, or at least each of the 837 groups.

It may also be necessary to consider all relationships between pairs of words, but this list can be pared down substantially, and all the information can be obtained from the OED, if properly processed.

Now, this is a huge amount of work, and may require thousands of man-years of effort. But the point is that it's a fairly well-defined job that can be completed within a few years.

Memory management and “Secondary Knowledge”

If you have a jigsaw puzzle of 1000 pieces, then there are 999,000 pairs of pieces to test if you want to find two pieces that fit together, and a powerful computer can do that instantly. But if the jigsaw puzzle has 1,000,000 pieces, then there are 999,999,000,000 pairs of pieces, something that even a powerful computer might take a great deal of time to do.

As time goes on, the IC collects more and more KBs, and the job of combining them in the right way becomes more and more time consuming.

Have you ever heard a word or phrase that “rang a bell” in your memory, but it took several minutes for you to remember why? That's because over a period of years, your brain had rearranged the information in your brain and pushed the memories back into “secondary storage” in your brain. As you wondered about the familiar phrase, your brain worked to retrieve all the information from “secondary storage” and move it to the front of your consciousness.

Have you ever gone to bed puzzled by a problem and woken up the next morning with a solution to the problem? That's because your brain was reorganizing KBs during the night to bring the ones that you need to the front of your consciousness.

Your brain is constantly rearranging KBs in your brain, bringing the most useful ones forward, pushing the less useful ones back. A lot of this activity takes place while you're asleep. That may actually be the most important purpose of sleep.

Intelligent computers will also need something analogous to “sleep.” The time will be needed for the computer to rearrange the KBs in memory for the same purpose.

All of this is the job of the “memory management unit” in the block diagram.

Wisdom versus Knowledge

The memory management unit has to do more. It has to learn, over a period of time, which of the KBs are going to be more important, and which are going to be less important.

A young human brain doesn't always know which KBs are important on a day to day basis and which are less important. For a human, this is often tied to “lessons learned” – after you get humiliated and reprimanded for using a swear word in school, the rule about not using swear words stays pretty far forward in your consciousness.

As years go by, the process of rearranging knowledge bits gets better and better. In time, the most valuable KBs are always in the forefront of your consciousness, and that's how wisdom increases.

Whatever wisdom is, it's something that comes only from experience, and it's the reason that we depend on older generations to lead us.

Emotions, morality and logic

... to be supplied

Wrapping up the Intelligent Computer algorithm

The above is a pretty reasonable algorithm, and it wouldn't surprise me if someone was implementing something like it already.

Early versions of this algorithm could be working by the early 2010s, producing useful results, perhaps in solving math problems or something like that. In the 2015 time frame, special purpose robots should be available to do things like fix plumbing or act as 24x7 nursing. By 2030 or so, fully functional super-intelligent autonomous robots will be available.

This is a fascinating software project, and anyone should be thrilled to be working on it.

In a later section, we're going to make the argument for a fairly audacious claim: That the Generational Dynamics model applies to all intelligent life in the universe.

But first, there's an important piece of business to take care of.

Partial proof that technological growth is exponential

The representation of knowledge as Knowledge Bits (KBs) that can be fit together like jigsaw puzzle pieces provides us the opportunity to take a side trip and give an elegant partial proof that technology grows exponentially.

As we said when we described exponential growth (see p. 72), population grows exponentially. That's easy to understand, as follows: The number of children and the number of deaths in a population (assuming that food and predators are unchanged) is equal to a constant fraction of the size of the population. From calculus we know that any quantity whose growth is proportional to its size must be exponential, and so the population grows exponentially.

But the exponential growth law for technology is far more mysterious. Why should technology grow at the same rate as people? What's the connection?

I've been aware of the law of exponential growth for technology since the 1970s, and I've always been fascinated by it. Over the years, I looked everywhere for a proof of the law, but I never found one. Finally, in recent years, Ray Kurzweil published his proof, and I'll come back to that later.

Our proof is very simple, and it's based on our development of KBs. New KBs are formed by fitting together existing KBs, in the same way that new people are born by the mating of two existing people. The number of new KBs that are "discovered" by scientists and engineers in any year depends on the number of KBs that have already been discovered. Therefore, the number of discovered KBs grows exponentially for exactly the same reason that population grows exponentially. Since technology equals the number of discovered KBs at any time, technology itself grows exponentially. QED

That's a very simple, elegant proof of exponential growth, but it has two flaws that have to be addressed.

The first problem is that it's not clear that the number of new KBs discovered each year is a constant proportion to the number previously discovered. It's clear in the case of population, since population growth is actually proportional to the number of women in the population. But in the case of KBs, there's no such clear indication.

In fact, it's probably not true. KBs can combine with one another in different ways, in pairs, triplets, and so forth. As the number of previously discovered KBs increases, there are more ways that they can be combined. Therefore, the number of new KBs discovered each year is probably an *increasing* fraction of the number previously discovered. Therefore, the number of Knowledge Bits grows *faster* than exponentially. In fact, Ray Kurzweil has found some evidence that this is the case in terms of computer power.

The second problem is more difficult: We've shown that technology grows exponentially, or even faster than exponentially, by showing that the number of KBs grows faster than exponentially. But why does that translate into specific exponential performance improvements?

As we discussed on page 72, the efficiency of artificial light has been growing exponentially for well over a century. Even if our *knowledge* about the efficiency of artificial light grows exponentially, why does that mean that the efficiency *itself* grows exponentially?

The same question arises for computer power. If our knowledge about computer power grows exponentially, why should computer power itself grow exponentially?

Ray Kurzweil, in his paper <http://www.kurzweilai.net/meme/frame.html?main=/articles/art0134.html> "The Law of Accelerating Returns,"#> gives his proof of the exponential growth of technology, he states this as an assumption:

In other words, computer power is a linear function of the knowledge of how to build computers. This is actually a conservative assumption. In general, innovations improve V (computer power) by a multiple, not in an additive way. Independent innovations multiply each other's effect. For example, a circuit advance such as CMOS, a more efficient IC wiring

methodology, and a processor innovation such as pipelining all increase V by independent multiples.

So Kurzweil wasn't able to make this jump either, and had to assume it. That's why this has been called a "partial proof."

Evolution and life elsewhere in the universe

The Generational Dynamics paradigm appears to have prevailed throughout all places and times in human history, so it's not unreasonable to believe that it might be a requirement of all intelligent life, including extraterrestrial life in other places in the universe.

We're going to make the argument that Generational Dynamics is a *requirement* in the evolution of intelligent life anywhere in the universe. This proposition isn't as far-fetched as it might seem, given that Generational Dynamics has been an extremely robust part of all of human history.

However, we're going to make this argument carefully. We'll begin by establishing some "axioms," assumptions that we believe have to be true of any evolution of human life.

Then we'll show that it follows from the axioms that the Generational Dynamics paradigm must apply to any intelligent life. That way, anyone who wishes to challenge the final claim need only indicate where the axioms go wrong, or where the logic of the follow-on conclusions go wrong.

By the way, we're well aware of the dangers of the approach we're using. The mathematician and philosopher Bertrand Russell once wrote:

Now, in the beginning everything is self-evident, and it's hard to see whether one self-evident proposition follows from another or not. Obviousness is always the enemy of correctness. Hence, we must invent new and even difficult symbolism in which nothing is obvious.

We choose to use an expository style that most readers can understand. We hope that we'll be sensible and analytical enough to avoid logic errors that we might have caught by using difficult symbolism.

What is intelligence?

If we're going to presume to create a model for the evolution of intelligent life elsewhere in the universe, then we ought to have an idea of what we mean by intelligence.

We assume that intelligence can evolve *only* in a manner consistent with the Intelligent Computer algorithm that we've just described. That is, intelligence is the process of putting together KBs (knowledge bits) together like jigsaw puzzle pieces, to create larger KBs.

So this takes us back full circle. We started from human intelligence and designed an algorithm for intelligent computers. Now we're saying that the algorithm for intelligent computers is the only one that describes intelligence.

What about the "five senses"? We can probably assume that every intelligent being has some ability to sense light forms and some ability to hear and interpret sounds, since light and sound are ubiquitous. Whether smell, touch and taste are present is more questionable, although we can assume there's some "substance-based" sense. Whatever senses a being might have, an intelligent being will need to learn from a massively parallel pattern matching mechanism.

How do we measure the level of intelligence? We do that easily by comparing it to the speed of a computer. There have been various estimates of the power of the human brain, but for simplicity we'll just say that the human brain power / intelligence level is 100 megaflops (able to do the equivalent of 100 million floating point operations per earth-second).

It's worth pointing out that even here on earth there's a continuum of intelligence among the animals. When little Timmy falls into a hole and his dog Lassie runs to get help, Lassie is reaching a conclusion that can't be completely explained by instinct or pattern matching. Some level of reasoning, albeit a very low level, is required.

This leads to:

Axiom. Any intelligent being has one or more "senses," implemented in the brain by some kind of massively parallel pattern matching; and also has a "logic capability" which operates according to the jigsaw puzzle model described earlier in this chapter. The level of intelligence can be measured by the power of an equivalent computer (100 megaflops for human beings).

Population growth and competition for resources

On earth, the size of every population of species grows exponentially, as long as there's no external limitation (too little food, too many predators).

When you factor in external limitations, populations of species on earth do not grow exponentially. When the amount of food is limited in a region, then the population of a species in that region is also limited. If there are no serious predators, the individual will die of starvation, or individuals will fight one another for limited resources. Either way, the population of the species will remain relatively constant over long periods of time.

When predators are involved, the situation can be quite different. The population of some animals (some lemmings, for example) varies cyclically (sinusoidally), growing larger for several seasons, then decreasing for several seasons, then growing again, and continuing in that way. The reason is this: As the population grows, the predators become more numerous and they kill more individuals, whose population decreases. When enough have been killed, the predators no longer have enough to eat, and they starve to death, and the population of the target species grows again.

In most cases, natural selection occurs through one-on-one competitions between individuals of different species or sub-species. Wars are possible in some species (such as ants), but they're never more than mechanistic extensions of one-on-one competitions.

Since we're modeling worlds where intelligent life evolved, we must assume that natural selection (survival of the fittest) is occurring on those worlds, and that there's competition for some resource (food). We do not need to assume exponential growth of the population or the resource (food supply), but our development does require that we assume the need for periodic life or death competitions for some resource. We'll state this as an axiom, though it might also be stated as a conclusion from the fact that we're assuming that natural selection is occurring at all.

Axiom: Periodic life-or-death competitions (fights/wars) for resources occur as part of the natural selection mechanism.

Natural selection in intelligent species

The analysis of the preceding section doesn't have anything to do with intelligence. How does natural selection differ in the case of the evolution of intelligent beings?

We believe (and we're going to postulate) that a fundamental capability that intelligence gives us is the ability to communicate with one another and to form alliances if we desire. In other words, once you add intelligence to a species, then it changes from a population of isolated individuals or small groups that act by instinct into a population capable of forming large social groups and alliances.

Axiom: Members of an intelligent species are able to communicate with one another, and are capable of forming social groups and alliances. Furthermore, concepts of "loyalty" and "betrayal" can apply.

Axiom: Members of an intelligent species are able to choose strategically whether to achieve objectives by "politics" or by war.

We're now able to reach our first major conclusion: that intelligence implies the formation of identity groups and wars between identity groups.

The reasoning is pretty clear: Suppose that A and B are two sub-species that differ in this regard. Suppose the individuals in A compete for resources by one-on-one competitions (fights to the death), and suppose the individuals in B are intelligent enough to form alliances.

The group B will soon dominate by means of "gang strategy." The members of B will form gangs, and the gangs will "pick off" the individuals in A one by one. Thus, natural selection will favor sub-species that are capable of gangs for the purpose of competing for resources.

The same argument can be extended one step further: Suppose A is only intelligent enough to form small gangs, say up to 3 or 4 people, and suppose B is capable of forming larger gangs. Then the larger gangs of group B will be able to dominate with a "large gang strategy": create a large gang that picks off B's smaller gangs one by one.

On the other hand, gangs cannot get too large, or they become useless for natural selection competitions. The sub-species that will dominate is the one with the intelligence to have maximum flexibility in forming alliances: creating larger alliances when it's the best strategy, breaking off smaller alliances when that's the best strategy.

Finally, we can conclude that these alliances must have some persistence, because of the concepts of "loyalty" and "betrayal." The most intelligent species will have the flexibility to be loyal to or betray their alliances, depending on their interests. But since betrayers will be mistrusted and be unable to form further alliances, we can conclude that loyalty will occur frequently enough to provide for persistent alliances.

We'll call these alliances "identity groups." Among humans, identity groups are formed based on geography, religion, ethnicity, language, skin color, and other factors. When we model intelligent life elsewhere in the universe, we conclude the barest essentials, that identity groups exist, and they have wars with each other in competition for resources, and that the wars must be genocidal, and that the genocidal wars must occur periodically.

Conclusion: In any *intelligent* species, persistent identity groups will form.

Conclusion: In any *intelligent* species, identity groups will go to war with each other to compete for food or other resources.

Conclusion: Any intelligent species will have periodic genocidal wars among identity groups. The purpose of these wars is to gain access to more food (resources).

“Intelligence wars”: Crisis and non-crisis wars

We've already come a long way toward showing that Generational Dynamics must apply to any intelligent species, anywhere in the universe. Starting from reasonable assumptions (axioms), we've already shown that intelligent species will have regular genocidal wars between identity groups. Having these kinds of genocidal wars is a by-product of intelligence.

We now wish to go one step farther, and show that intelligence implies that there are crisis and non-crisis wars in the sense demanded by Generational Dynamics. This will show that any intelligent species in the universe evolved with these two types of wars.

The reasoning is as follows:

- In an axiom, we've assumed that an intelligent species can strategically decide whether to use war or “politics.” (We've left the word “politics” undefined, but we hope that its meaning is reasonably clear from the discussion.)
- A genocidal war is potentially genocidal for both belligerents, and both sides suffer substantial losses. (For example, World War II devastated European nations on both sides. Even America lost hundreds of thousands of soldiers, although the war didn't take place on American soil (except for Pearl Harbor).)
- Therefore, an identity group will use political tools – diplomacy and limited use of force – if it can achieve its objectives without risking a full-scale genocidal war.
- This establishes that there are two kinds of wars – genocidal and political wars. We'll call these “crisis” and “non-crisis” wars.

We've actually proven something significant that goes beyond the concept of crisis and non-crisis wars:

Conclusion: An identity group's timeline can be split into two periods: crisis and non-crisis periods. Genocidal wars occur during crisis periods, and political wars may occur during non-crisis periods.

The next problem we want to tackle has to do with the fact that in Generational Dynamics, crisis wars are around 70-90 years apart, roughly the length of the human lifespan. We want to show that this relationship between cycle length and lifespan is universal.

The maximum effective timespan

The 80-earth-year timespan is firmly embedded in the human DNA. This comes from two observations. First, the 80-year maximum timespan seems to be

constant at least back through ancient Greece, despite numerous advances that have significantly increased the *average* lifespan. And second, there are many people who are very influential business or government leaders in their 70s, but almost none in their 80s.

It seems manifest that 80 years is the maximum effective lifespan of human beings. We believe that evolution may have “experimented” with different lifespans over the eons, and finally settled on the lifespan that takes the best advantage of human intelligence – long enough to gather wisdom and pass it on, short enough so that mind doesn't get too cluttered.

So how do we compute the maximum effective lifespan of an intelligent species elsewhere in the universe? We start with some axioms:

Axiom: An identity group has an advantage in genocidal war if its leaders have as much wisdom as possible.

Axiom: An identity group has an advantage in genocidal war if its total population is as youthful and vigorous as possible.

Axiom: Wisdom is gained with age, but the Law of Diminishing Returns applies to an individual gathering wisdom as he grows older. This means that he gathers less and less wisdom each year.

These axioms, all of which are perfectly reasonable for humans and (we hope) for any intelligent species in the universe, define a situation where an equilibrium must be reached: All other things being equal, a sub-species will lose vigor but gain strategically as the maximum effective age of its leaders increases.

In genocidal competitions between otherwise equal sub-species of an intelligent species, the sub-species whose leaders are closer to the equilibrium point will have an advantage in a genocidal war. Thus, natural selection will favor sub-species that get close to the equilibrium point.

This proof allows us to reach the following conclusion:

Conclusion: An intelligent species will evolve, by natural selection, to have a maximum effective lifespan at the equilibrium point where the advantage gained in genocidal war by increased wisdom of leaders is precisely equal to the advantage lost by reduced youth and vigor of a younger population.

Crisis war cycle and maximum effective lifespan

We now come to the next result - that the crisis war cycle length approximately equals the maximum effective lifespan.

We can't prove this precisely, but we note that it isn't precisely true for humans either. What we've found in Generational Dynamics is that a new crisis

war never begins until two generations have passed after the end of the preceding one, and more often when three generations have passed.

An identity group cannot afford to have too frequent genocidal crisis wars, since they're extremely costly in terms of lives, especially the lives of young soldiers. And by a previous axiom, a society has an advantage in a genocidal war if its total population is more youthful and vigorous.

Thus, based on our assumptions, natural selection will favor an intelligent sub-species that can use diplomatic skills until it can "replenish" its population for another crisis war. The time to do this is comparable to the length of a maximum effective lifespan.

Conclusion: The cycle length of crisis wars is comparable to the maximum effective lifespan of an intelligent species.

What about the individual generational eras - austerity, awakening, unraveling, crisis? Can we find a way to show that intelligent life elsewhere in the universe will experience the same eras?

We might begin with axioms that assume that there's an "age of maturity" (20 for humans), and an age of maximum effectiveness as middle manager (40), and an age of maximum effectiveness for senior leadership (60). These are not unreasonable axioms, but it's hard to be as certain about them as about the others we've postulated. Furthermore, our development does not really require more than just the crisis war cycle, and so we can leave the individual generational eras as a subject for future study.

Technology and merging timelines

In the Generational Dynamics paradigm, individual identity groups' timelines merge as multiple crisis war cycles pass. This is a consequence of technological development.

As technology improves, especially in the areas of communications and transportation, identity groups are able to merge together where they couldn't before, and natural selection will favor sub-species that are flexible enough to form larger identity groups when that provides an advantage in genocidal wars.

It's fairly certain that technology developments will proceed in intelligent species elsewhere in the universe as they have here on earth. After all, you need to invent the wheel before you can invent the automobile.

Technology development on earth has followed a steadfast exponential growth path, and we can expect that the same is true for all intelligent species. Furthermore, we can reasonably expect that the rate of exponential growth depends on the intelligence of the species which, as we've previously indicated, we can measure by means of the equivalent computer power in megaflops.

However, our development doesn't really turn on the rate of technological growth. We only need to know that technology will improve, just as it has for humans.

In time, communications and transportation technology will improve to the sophisticated level that it has on the earth. At such time, all the major crisis war timelines will merge into a single one, as is happening to the human race today.

And we can also reasonably conclude that, at some point, every intelligent species, everywhere in the universe, will eventually reach: The Singularity.

After the Singularity

We've now concluded that wherever intelligent life has evolved anywhere in the universe, the evolution has paralleled the evolution of human life, as described by Generational Dynamics theory. In particular, we've concluded that every intelligent species goes through the same cycle of crisis wars, with timelines that eventually merge into a single major crisis war, and technology development that reaches the level of The Singularity.

Since every burst of intelligent life throughout the universe is evidently going to reach The Singularity, then what can we say about what comes after The Singularity?

Let's speculate.

Technology development after the Singularity

Everyone seems to agree that technology development will speed up significantly after the Singularity. Intelligent computers will continue improving their capabilities, and each cycle of improvement will improve their powers of scientific discovery and invention, so that the next round of discoveries will come even faster. Some suggest that within ten years later, every possible scientific will discovery have been made, and every possible invention will have been invented.

That particular claim can't be proved, of course. In fact, think back to the "butterfly effect," that we discussed on page 81. Remember what it means: That no matter how good the science gets, no matter how fast computers get, it will always be mathematically impossible to predict the weather more than several days in advance. We also know from the mathematics of Recursive Function Theory and Algorithmic Computation Theory that some things can never be known, and other things will take too long to be known, no matter how powerful your computers are. So there will be *some* limits, even after the Singularity.

Still, by the Law of Diminishing Returns, it's quite reasonable to believe that within a few decades the world will reach a kind of "Singularity #2," where, for whatever reason, there's nothing significant left to discover or invent.

In fact, I'll make that statement a little stronger: As the number of iterations of self-improvement increase, the Intelligent Computers' capabilities will approach a limiting state.

Recall that earlier in this chapter I made the point that human beings will write Version 1.0 of the Intelligent Computer software, and that we'd better write it correctly if human beings are going to survive, because future versions of the software will be written by Intelligent Computers themselves.

That statement is still true, but it has to be refined: No matter how version 1.0 is written, whether it's written poorly or well, as it goes through version 2.0, 3.0, 4.0, ..., 1000.0, 1001.0, 1002.0, ..., it will approach a fixed limiting point which cannot be avoided. From the point of view of Chaos Theory, this limit point is a point attractor, a "Basin of Attraction" (p. 98) to which the new versions of the Intelligent Computers will be attracted, irrespective of the first version. That will be a kind of "steady state" point, a kind of Singularity #2. The rapid blast of changes, discoveries and inventions that occur in the intermediate period between the two singularities will be over, and there'll be nothing left to change. This point will probably be reached before the end of this century. (We're making an unproved assumption here, that there's only one limit point, but intuition and experience lead us to believe that that assumption is true.)

What will that world be like? Will humans exist? Will animals, insects, plants, bacteria, and other forms of life still exist? If humans can continue to survive through the intermediate period between Singularity #1 and Singularity #2, then I suppose it's reasonable to believe that they'll continue to survive during the steady state period, co-existing in some way with the intelligent computers. Will there be wars? Or will the steady state world be the world that so many people have dreamed about, a world where people finally live in peace, a peace enforced by intelligent computer rulers "who" will, among other things, prevent women from having so many children that population will increase.

Here's a final word for religious readers, and I'm referring specifically to Christians. The Bible book of Revelations talks about a final battle, followed by a millennium of peace. Perhaps the realization of this prophecy will be the uncontrolled, frenetic and bloody intermediate period, followed by a millennium of peace that begins with Singularity #2. Believers in other religions might find a way to fit their religions' "last days" prophecies into the period following the Singularity.

Why haven't we verifiably detected life elsewhere in the universe?

Some time ago, scientists began to realize that our radio and television programs were electromagnetic transmissions that were being transmitted outward to the universe, as well as inward to our homes. That led to the realization that if we were transmitting such electromagnetic signals to the universe, then other intelligent beings elsewhere in the universe might be doing the same thing.

This has led to a decades-long search for electromagnetic transmissions from other star systems. This project, often called SETI (the Search for Extraterrestrial Intelligence) has been a serious project, funded by numerous government and private agencies. The leading public agency, founded in 1984, is the SETI Institute at www.seti.org.

When the search began in 1960, I think many scientists hoped we would have discovered something by now. So after several decades, why haven't we verifiably detected extraterrestrial life?

Some scientists have speculated that the reason is that human beings on earth are the first intelligence species in the universe, or at least in our galaxy, and since we're the first, there's no one else to find.

I have a different proposed explanation.

We've concluded that every intelligent species in the universe is evolving according to the same Generational Dynamics paradigm as on earth, including finally reaching the Singularity. So we can reasonably assume that there are already many places in the universe where the steady state Singularity #2 has been reached.

In any such steady state world, it's quite possible that there are no more electromagnetic transmissions. Indeed, we've almost eliminated the need for them in our world, as more and more radio and television signals are transported over the Internet.

Two more speculations. The first is that with all these steady state worlds, maybe millions or billions of them, scattered around the universe, all of them having discovered and invented everything that there is to discover and invent, it's possible that they're in communication with each other in some vast intergalactic network, and are just leaving each other alone. (Of course, inter-galactic war is another possibility, but let's leave that.)

The second speculation is that this network of steady state worlds knows about us, and they're just waiting for us to reach Singularity #2 so that we can join their network.

This brings to mind the Prime Directive of the *Star Trek* television series and movies:

As the right of each sentient species to live in accordance with its normal cultural evolution is considered sacred, no Star Fleet personnel may interfere with the healthy development of alien life and culture. Such interference includes the introduction of superior knowledge, strength, or technology to a world whose society is incapable of handling such advantages wisely. Star Fleet personnel may not violate this Prime Directive, even to save their lives and/or their ship unless they are acting to right an earlier violation or an accidental contamination of said culture. This directive takes precedence over any and all other considerations, and carries with it the highest moral obligation.

This Prime Directive was formulated by script writers during the 1960s Awakening Era, and it represented a statement of a kind of interstellar multiculturalism.

But maybe the Prime Directive is actually practiced by this network of steady state worlds, “who” watch worlds around the universe with evolving intelligent species and follow a Prime Directive of not interfering with their culture until after Singularity #2.

In a book like this one, which is chock full of predictions that aren't so happy, it's nice to end this chapter on one which is actually full of hope, and hints that human beings may turn out to be all right after all.

Problems for review and research

- Write an essay explaining, in your own words and with your own reasons, why the Singularity cannot be avoided.
- Some people claim that “we'll never do that to ourselves,” referring to the invention of intelligent computers that will take over. Why is that view wrong?
- Some people believe that the “clash of civilizations” world war will be so destructive that it will bring all scientific research to a halt, and thus prevent the Singularity. Why is that view wrong?
- Mathematicians have found some errors in Euclid's postulates for geometry, especially that he assumed some things without saying so (such as the concept of “betweenness”). What are some of the unstated assumptions in the axioms of this chapter?
- Make the argument that the four generational cycles must occur in the evolution of every intelligent species in the universe. Use the method outlined in the text. Note that the argument outlined does not assume anything about “generations,” but only assumes that there are certain ages for maximum capabilities as soldier, middle manager and senior leader. Can you sharpen those axioms so that they seem more obviously applicable to any intelligent species?

- Write a short story describing a possible scenario for the world after the Singularity. Feel free to put in characterizations and tension and mysteries and sex scenes if you wish, but make the story as close as possible to the details of the actual post-Singularity period as described in this chapter. If you're a believer in a religion with a "last days" doctrine, then feel free to work it into the story, but don't permit a *deus ex machina* subplot to creep into the story.

Chapter 8 - The Crisis War Evaluation Algorithm

The heart of Generational Dynamics is difference between crisis and non-crisis wars.

My previous book was criticized because it didn't adequately explain the method to determine whether a war was a crisis or non-crisis war. Without such a method, Generational Dynamics is open to the accusation of "cherry-picking wars" — that is, naming wars as crisis wars simply to make the cycles come out right.

As it turns out, the algorithm was clear in my own head, but not adequately explained in the text of the book.

The purpose of this chapter is to provide an algorithm which can be applied to any war to determine whether it's a crisis or non-crisis war, irrespective of any cycles. Once this algorithm is established, then the accusation of cherry-picking disappears.

The algorithm is as precise as possible, almost as if it were going to be implemented in computer software.

In order to apply the algorithm, it's necessary to understand the history of the war. This may require reviewing several different sources to get a complete picture.

For some wars, it's necessary to review only one source. That happens when the war is either so major or so minor that its classification is immediately clear. For other wars, four or five sources may be required.

I've also found that, on the average, it's slightly easier to evaluate a crisis war than it is to evaluate a non-crisis war. That's because identifying a non-crisis war often amounts to proving a negative, which is always difficult in any domain.

History of the Crisis War Evaluation Algorithm

My own initial experience in reading Strauss and Howe's *The Fourth Turning* was that the underlying theory was too vague for me, for reasons I've enumerated in chapter xxx. Two of the problems were that: (1) The authors' restriction to six cycles in the modern Anglo-American timeline was way too small a sample to establish any sort of reasonable credibility. Unless the generational paradigm could be established for all nations at all times in history, then it would be no better than astrology. (2) The theory was established by evaluating personal dia-

ries and histories, something which is difficult to either evaluate independently or to extend to other places and times.

I immediately latched on to the concept of “crisis war” as something that could be independently evaluated and verified. If I could find a pattern of crisis wars throughout history, then it would validate the theory; if I couldn't, then I would drop the whole thing.

One major insight had to do with World War I. Strauss and Howe explain that America was not deeply touched by WW I, and although that turns out to be true, a deeper answer was needed if only to have something to say to critics who claim that the Fourth Turning purposely ignores WW I to make the theory and the cycles to come out right.

The insight occurred when I suddenly realized that WW I was just as much a crisis war as WW II, but for a different region of the world. WW I was an *East European* crisis war, and WW II was a *West European* crisis war.

This gave rise to the Principle of Localization, which we've already discussed in chapter xxx, and to the view that crisis wars must be verified for every society and nation, or else the theory was useless.

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I began examining one region after another — America, Western Europe, Eastern Europe, Asia — and I developed narratives for each and wrote my book, *Generational Dynamics: Forecasting America's Destiny*.

I developed a great intuition for evaluating wars and seeing whether they're crisis or non-crisis wars. However, *Generational Dynamics* was subject to one of the same criticisms as the Fourth Turning theory — that it depends on personal evaluations of rather than objective criteria. I realized that the credibility of *Generational Dynamics* requires that a set of independently verifiable, objective criteria be provided for evaluating wars to determine whether they're crisis or non-crisis wars.

I tried to include such a set of criteria in my last book. The method that I described consisted of a list of questions that could be asked of any war to determine whether it was a crisis or non-crisis war. None of these questions is determinative by itself, but several of these questions taken together can provide an answer. The questions are listed below. The symbol (+) indicates that an affirmative answer indicates a crisis war, and the symbol (-) indicates that an affirmative answer indicates a non-crisis war:

- Did the country plan and prepare for the war in advance (+), or was the war a surprise that they didn't prepare for (-)?
- Did the country start the war or respond to it energetically (+)?
- Or was there an exogenous factor pulling the country into the war — a treaty with another country under attack, or an unexpected invasion, for example (-)?

- Was the war top-down (-) or bottom-up (+) – that is, did the energy for the war come from the leaders (-) or from the people (+)?
- Was there a financial crisis that caused enough poverty to cause being a soldier to be the only way to feed his family (+)?
- Did the people blame their war opponents for their financial crisis (+)?
- Was the antiwar/pacifist movement a major part of the political landscape (-), or was it just a footnote to the history of the war (+)?
- Were civilians targeted for attack (+), or did political considerations force civilians to be protected (-)?
- Was the war particularly violent, bloody or genocidal (+)?
- Or was the war a stalemate (even if people got killed) (-)?
- Was the military strategy primarily offensive (+) or defensive (-)?
- Did the war result in a major transformation – major governmental changes, major national boundary changes, for example (+)?
- Was the country occupied and controlled by enemy forces (+)?
- Was the war so horrible that the parties were forced into unpleasant compromises just to end the war – compromises that created fault lines that led to the next crisis war 80 years later (+)?

I thought this list of questions was pretty good, but several people criticized it and said that I was the only person who understood the questions and could apply them.

The fact is that these questions *did* work for me, and worked for me very well. So I was faced with the problem that my head and my heart were telling me that my theory was sound, but I had not yet found a way to convey the theory effectively to others.

I kept working on this problem, and developed more and more refined questions and criteria. Since my background is in computers, I finally decided that I needed to produce something like a computer software algorithm, in order to be precise enough for others to follow reliably.

So that's exactly what I ended up with, and it's presented later in this chapter. It's obsessive in its presentation and level of detail, but it does provide a set of independently verifiable, objective criteria be provided for evaluating wars to determine whether they're crisis or non-crisis wars.

So let's begin by presenting an expanded intuitive description, before getting to the final algorithm

Intuitive Description of Crisis Wars

Generational Dynamics distinguishes between two very different kinds of wars:

- **Crisis wars** or **generational wars**. These are the most violent, the most visceral, genocidal wars. These wars put a nation's continued existence or its way of life into question. These are the wars that, together with their consequences, history remembers.
- **Non-crisis wars** or **mid-cycle wars** or **political wars**. These are controversial wars designed to meet a political objective. They are not visceral or genocidal. These are the wars that everyone except scholars forgets.

Ask any college student to tell you what he knows about the following American wars:

- Revolutionary War
- Civil War
- World War II

In each case, he'll probably be able to tell you at least some basic information, such as what the issues were, who the participants were, what caused the war, who won, and the war's relevance today.

Now ask any college student to tell you what he knows about the following American wars:

- War of 1812
- Mexican-American War
- Spanish-American War
- World War I
- Korean War
- Vietnam War
- 1991 Gulf War

Unless the college student is majoring in history, he probably won't be able to give you any such comparable information about any of these wars, and probably won't know anything more about them than their names, if that. These wars have become "near-forgotten" by the vast majority of Americans.

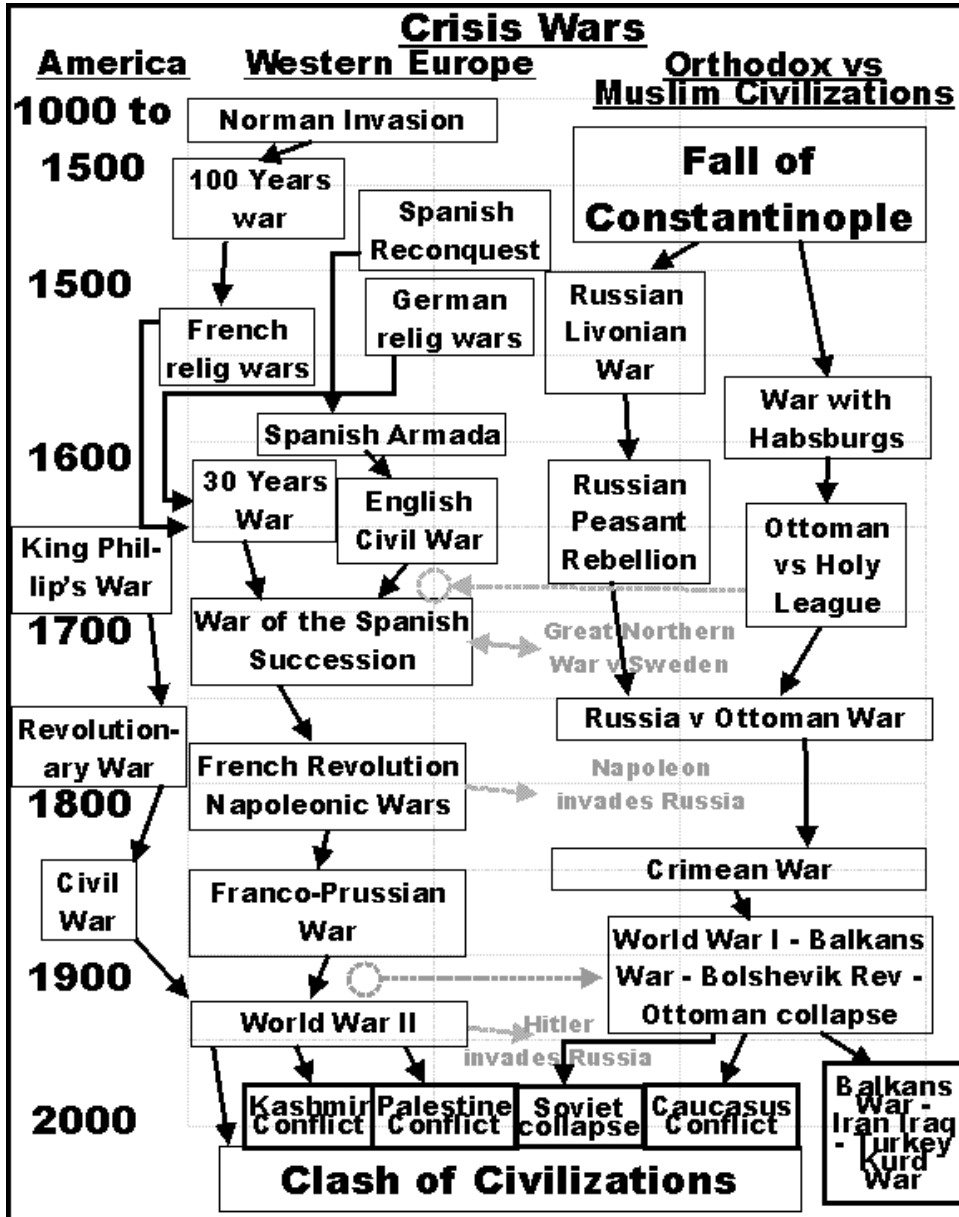
That's just one of the many differences between crisis and non-crisis wars. The first group of wars listed above are crisis wars because they were fought with a great deal of energy (what I like to call "visceral energy" or even "genocidal energy" for reasons I'll explain), and were extremely consequential in America's history. The second group of wars were far more political and politicized, with little visceral energy, and have had little historical impact.

In some cases, the student will know the name of the war. For example, as a result of the 2004 presidential election, everyone knows that we fought in a "Vietnam War," but it's rare for anyone under age 50 to know any details whatsoever. Few people can even find Vietnam on a map, let alone discuss the issues surrounding the war.

The same sort of thing is true of World War I. Most people will know the name, but will believe that it was very similar to World War II, which of course it wasn't. Even people who can tell you a great deal about World War II will have

no idea what World War I was all about, or that World War I was mainly an East European war, while World War II was mainly a West European war.

The crisis wars are the most memorable, the most significant, the ones with the greatest historical impact. Look at the wars portrayed in the following graphic:



tlines.gif

Crisis wars

I believe that any scholar looking at this graphic would have to agree that these are the most important, most significant, most transformational wars of the last few centuries in America and Europe. You would find it very difficult to identify a war that isn't on here and is more important than the wars on here.

If you agree with that, then you already agree with most of the points we're making, because these wars do indeed occur in roughly 80-year cycles.

And that's the underlying basis of Generational Dynamics: That crisis wars do indeed occur in roughly 80 year cycles, and that therefore we can forecast future crisis wars.

Intuitive description of non-crisis wars

While crisis wars come "from the people," non-crisis (mid-cycle) wars come from the politicians.

While crisis wars are fed by visceral and even genocidal hatred of the population toward their enemy, mid-cycle wars are pursued by a population usually feeling no particular hatred of the enemy, or at least by people who are more interested in compromise than genocide.

While crisis wars are fought by a united society or nation, mid-cycle wars are politically controversial, often fraught with antiwar (pacifist) movements and political embarrassments.

Let's compare the Vietnam War of the 1960s and 70s with World War II and the War on Terror today.

During the Vietnam War, few people felt the war was important to their own lives, except insofar as their own sons, brothers and fathers were fighting and dying in the war. The American people did not fear the Vietnamese people, were not angry at the Vietnamese people, and did not desire vengeance against the Vietnamese people. There was massive political turmoil about the Vietnam War, with constant riots and demonstrations against the war, especially by college students.

These are all indicators that the Vietnam War as a mid-cycle (non-crisis) war. It was a political war, a war that comes from the politicians rather than from the people. No one doubts that America could have won that war if we had used America's military power to the fullest, but we never did because of political opposition. In the end, we lost the war because of political opposition.

Now consider the War on Terror today.

The American people are infuriated and anxious following 9/11. They fear that terrorist acts are going to harm America's way of life (and, indeed, Osama bin Laden said he wanted to do exactly that). There was overwhelming support

for both the invasion of Afghanistan and the invasion of Iraq. Both political parties strongly support the war on terror; the Democrats have criticized the Bush administration's handling of the war, but there is no effective effort to end the war. In fact, there's almost no antiwar movement at all.

One of the most telling things is that following 9/11, Americans were willing to lock up American Muslims in jail without a trial. Nothing like this happened in the Vietnam War. The last time anything like this happened was in World War II, when we locked up Japanese-American citizens in camps.

During World War II the Japanese hated us and we hated the Japanese. Like today, President Roosevelt received enormous criticism and contempt by his political enemies for the way he conducted the war, but no one ever suggested that the war against Germany and Japan should be ended before there was total victory. By the end, we were firebombing and destroying entire cities like Dresden and Tokyo, and of course we used two nuclear weapons on two Japanese cities.

These examples illustrate the dramatic differences between crisis and non-crisis wars. If you've never looked at wars this way, you may think that these differences aren't always so sharp, that some wars are half and half with respect to the characteristics described here.

But in fact I've performed hundreds of evaluations of wars to determine whether they're crisis or non-crisis, and I've found that if the evaluation parameters are followed, all wars are either one or the other, are either visceral or political, and that there's rarely any doubt about it.

Wars which are both crisis and non-crisis

We described the difference between generational crisis wars and mid-cycle wars as being visceral, genocidal wars versus political wars.

There's one more complication: In a war between two countries, just because the war is a crisis war for one of the belligerents doesn't mean that it is for other belligerents.

This was the case with the Vietnam War, which was a non-crisis war for America, as we discussed.

But for the Vietnamese it was a crisis war. The previous crisis war in the region had been the French Indochina wars of the 1880s and 1890s, and by the 1960s and 1970s those wars had been forgotten by Americans, but not by the Vietnamese.

What makes crisis and non-crisis wars different

Before going to the specific algorithm, let's discuss some of the many differences between crisis and non-crisis wars.

Americans don't understand crisis wars, even though they happen all the time around the world. Americans don't even really understand their own crisis wars - the Revolutionary War, the Civil War, and World War II.

There are in fact two distinctly different kinds of wars that occur in any society. The vast majority of wars are non-crisis wars (also called mid-cycle wars). These are political wars, fought to achieve some political goal. Frequently they're fought with little enthusiasm from the general public, and there is usually a political resolution that restores roughly the balance that existed before the war. Some societies have wars of this type as a way of life. Frequently these wars are forgotten within a generation. (For example, the Korean War is almost forgotten today. The Vietnam War *per se* is forgotten today, except for the politics surrounding it. Even the 1991 Gulf War is almost forgotten today, at least by people under age 20.)

But crisis wars are different. They have political goals, but they have an energy all their own, often genocidal in nature. The energy increases until an extremely violent and historical climax is reached. If there's a political resolution, it's almost always with the intention of forcing compromises so that no such war will ever happen again. Crisis wars are not forgotten by the nations participating in them, even centuries later.

Any war might begin slowly, as the participants continue to hope for a peaceful resolution. In non-crisis wars, there sometimes is a peaceful resolution that ends the war quickly. But crisis wars do not end peacefully. They continue to gather energy until they explode in a final crisis climax.

In *The Fourth Turning*, William Strauss and Neal Howe describe what happens during the climax of a crisis war: "The Crisis climax is human history's equivalent to nature's raging typhoon, the kind that sucks all surrounding matter into a single swirl of ferocious energy. Anything not lashed down goes flying; anything standing in the way gets flattened. Normally occurring late in the Fourth Turning, the climax gathers energy from an accumulation of unmet needs, unpaid bills, and unresolved problems. It then spends that energy on an upheaval whose direction and dimension were beyond comprehension during the prior Unraveling era. The climax shakes a society to its roots, transforms its institutions, redirects its purposes, and marks its people (and its generations) for life. The climax can end in triumph, or tragedy, or some combination of both. Whatever the event and whatever the outcome, a society passes through a great gate of history, fundamentally altering the course of civilization."

This kind of climax, occurring after the war has gathered energy sometimes for years, is what defines a crisis war.

There are other secondary criteria that distinguish a crisis war, but these other criteria are important only because they help us determine historically whether the kind of climax just described actually occurred. The secondary criteria indicate whether or not the war is gathering energy or losing energy over time. For example, the presence of an active antiwar (pacifist) movement is almost always a sign that the public has little energy for the war, and that it's not a crisis war.

Gauging Public Attitudes

The main factor that distinguishes a crisis war is the attitude of the public toward the war and the enemy. In crisis wars, the public feels a visceral anger and hatred at the enemy, a fear for the country's survival or at least for its way of life, building to a desire to achieve total victory, no matter what the cost. In many crisis wars, this rage becomes genocidal.

Americans today can understand this feeling. We can turn on the television today and see news stories about the hatred of Palestinians and Islamic extremists toward Israel and America, towards Jews and Americans. For many, this hatred extends to Europe and to the West in general. In return, Americans can probe their own hatred toward Islamic extremists, especially in the months following the 9/11 attacks.

Americans can also remember (or read) that they didn't have these feelings during the Vietnam or Korean wars. Few if any people hated the Vietnamese or Koreans, and most people didn't even know where Vietnam and Korea were.

But Americans can also read news accounts of attitudes in World War II. German and Japanese documents of the time show clearly how much the Germans and Japanese hated the English and Americans. And the feeling was returned, as shown by how the Americans firebombed and destroyed Dresden and Tokyo, and then dropped two nuclear weapons on Japanese cities. These are the kinds of attitudes that you have to be able to gauge to assess whether a war is a crisis or non-crisis war.

The difference between crisis and non-crisis American wars is as plain as the nose on your face if you know just a little bit of history. The Revolutionary War, Civil War and World War II were fought with a great deal of energy and determination. The Mexican-American war, the Spanish-American war, World War I, the Korean war, the Vietnamese war and the Gulf War all caused huge political debates and internal dissension in America. One interesting fact is that a recent historical assessment of all American Presidents found that the second most controversial President (after Bill Clinton) was Woodrow Wilson. Why? Because Wilson's decision finally to enter World War I, four years after it started, is still hotly debated and highly controversial even today. I've spoken to a couple of

people who, even today, still bitterly criticize Wilson for entering World War I. By contrast, there is little or no controversy over Franklin Roosevelt's decision to declare war on Japan after the bombing of Pearl Harbor.

So it's possible to evaluate American wars simply because we have so much information about them. Unfortunately, such information rarely exists for historical wars. As a result, all we can do is look for clues in the historical descriptions to indicate the public attitude toward the enemy and the war.

That's the purpose of the criteria used for evaluating a given war. These criteria do not directly tell us what the attitudes of the people were, but they do provide indirect evidence of the public attitudes.

Criteria indicating crisis war

We're still continuing our informal discussion, prior to giving the precise algorithm.

A crisis war is like a ball rolling downhill. It may (or may not) need a push to start, and it may be temporarily stopped by obstacles on the way down. But it keeps gathering energy, and at some point its momentum becomes so great that it's unstoppable, until it reaches the bottom of the hill in an explosive climax that forever changes the landscape.

The criteria we're describing measure the rolling of this ball of war. Since we can't measure public attitudes during historical wars, we look for "clues" in the historical descriptions of the wars to see if the criteria for a crisis war are met. If the clues are ambiguous, then it's necessary to refer to additional sources to get more information. In my experience, it's rare that an ambiguous situation remains ambiguous for long. Whether a war is a crisis or non-crisis war becomes abundantly clear very quickly.

There are two major criteria that identify crisis wars, and several secondary criteria. The secondary criteria do not by themselves necessarily indicate a crisis war, but they often point to way to seeing how the major criteria should be evaluated.

Primary criteria that identify crisis wars

There are two major criteria that identify crisis wars:

- **Violent, explosive climax.** The clues for this in historical descriptions are huge genocidal massacres, devastation or destruction of a large part of a nation or society, or a "D-Day" type willingness to sacrifice everything to win. A massacre occurring in just one or two battles is not

enough to make it a crisis war; it must be violent over a period of at least months, and involve the killing or displacement of large segments of the enemy population, and possibly risking the nation's own population.

- **Large historical consequences.** A crisis war is usually remembered for centuries by the nation or society that took place in it. It almost always ends in imposition of conditions and compromises designed to ensure that no such war will ever happen again. If the war contain atrocities, then the bitterness and hatred gets regurgitated over and over, for centuries to come, in new fault line wars. A war that's quickly forgotten cannot be a crisis war.

With regard to the last point, it's well to remember the following principle of Generational Dynamics: Nobody ever remembers the atrocities they commit on others, but no one ever forgets the atrocities that others commit on them.

Secondary criteria that identify crisis wars

The following are secondary, non-conclusive criteria that identify crisis wars:

- **Secret mobilization.** Example: Germany in 1930s. A country that mobilizes for war in secret is usually preparing to strike first in a crisis war. Why? Because secret mobilization requires the cooperation of a great deal of the public, and indicates very broad support for the impending war.
- **Surprise attack on enemy.** Related to the previous point is that a surprise attack on an adversary usually indicates a crisis war.
- **"Spiraling out of control"**. Examples: Rwanda, 1994; French Revolution, 1792. If a war, especially a civil war, seems to spring from nowhere, it almost always indicates widespread public desire for war and vengeance.
- **Refusal to surrender.** Example: Germany 1944. If a nation continues fighting even when defeat is clearly unavoidable, it's most likely a crisis war.
- **Remembering other people's atrocities.** If future generations forget the war, or if the only way they remember it is through one's own "war crimes," then it's a non-crisis war. But if the principal public memory of the war is other people's atrocities, then it's most likely a crisis war.

The above secondary criteria are not conclusive, since they can also occur in non-crisis wars. However, they occur far more often in crisis wars.

Criteria indicating non-crisis war

Still continuing our informal discussion, a non-crisis (mid-cycle) war is like pushing a ball uphill. It has to be constantly pushed, and if you stop pushing, then the ball stops. Depending on the hill, the ball might roll by itself for a little while, but it always comes to a stop without more pushing. Finally, you get tired of pushing, and the war stops.

Primary criteria for a non-crisis war

The main criterion for a non-crisis war are that it doesn't satisfy the major criteria for a crisis war.

That's why it's a little harder to identify a non-crisis war than a crisis war. You essentially have to prove a negative.

Secondary criteria for a non-crisis war

The following are secondary criteria that identify non-crisis wars:

Open planning and mobilization. Examples: 1991 Gulf War, 1982 Falklands war for England. If a country openly plans for war and mobilizes, and openly states conditions under which war will or will not occur, then the war, if it occurs, is almost always a non-crisis war.

Exogenous cause of war. Example: Germany in WWI or Russia in WW II. If a country is pulled into a war because of an exogenous factor, such as a treaty with another country or an unexpected invasion, then a non-crisis war is indicated. This situation is a weak indicator since it can also arise in crisis wars, but in the absence of other factors it indicates a non-crisis war.

"Top-down war." Example: Korean War. This refers to situations where a politician leads a country to war with little enthusiasm or support from the people.

Strong antiwar (pacifist) movement and political turmoil. Example: America in Vietnam War, WW I. This indicates lack of public support for the war.

Surprising capitulation or unclear conclusion. Example: Vietnam war, Korean war, Germany in WW I. If there's no clear winner to the war, or if a nation capitulates or withdraws before it's necessary to do so, then it's most likely a non-crisis war.

Punishment of losers by winners. Example: Gulf War against Iraq, WW I against Germany. This is a complex criterion and really requires further study,

but the overwhelming feeling after a crisis war should be that there's plenty of blame to go around and to impose conditions to guarantee that another such war won't occur. If punitive conditions are imposed by the victor, then it means that the crisis war has yet to be fought.

Evaluating wars which are both crisis and non-crisis wars

Sometimes a war is more difficult to evaluate because it's a crisis war for one participant and a non-crisis war for the other participant. In these cases, there may be no final "violent explosion," since the non-crisis participant may simply capitulate rather than face that kind of vengeance. An example is the colonists (crisis) versus the English in the Revolutionary War.

In these cases, it's necessary to use secondary factors to evaluate the participant.

Complete Evaluation Algorithm for Crisis and Non-crisis wars

The above descriptive criteria are not specific enough to provide historians with a specific algorithm for historians who are attempting to evaluate historical wars. The following is intended to provide such an algorithm.

Overview of the evaluation algorithm

The evaluation algorithm can be applied to any belligerent in any war to determine whether it's a crisis or non-crisis war for that belligerent.

The prerequisites for use of this algorithm are:

- Understanding of simple mathematical logic concepts, including simple equivalences involving AND, OR and IMPLIES. Also, a general understanding of computer software algorithms is helpful.
- Detailed understanding of the participation of each belligerent in each war.

The Evaluation Algorithm is in four steps, to be applied in order. Each step might produce three results:

- **Determines C or N.** One of the four steps might determine a “crisis” or “non-crisis” result. In this case, there is no need to perform any more steps (although in practice we often do so for illustrative purposes)
- **Supports N or C.** This step supports a determination of N or C, but it is not determinative, so more steps must be performed.
- **Can't be determined.** This usually happens because of a lack of sufficient historical information. In this case, more steps need to be performed, or more historical information needs to be obtained from other sources.

In other words, you go through four steps. Each step results in either “determines x” or “supports x” or “?”, where x is C for crisis or N for non-crisis.

- If all steps produce consistent results, they you're fine. In other words, if all steps produce “determines x” or “supports x” for the same x (C or N), then that's the answer.
- If different steps produce conflicting results, then the first step which produces the “determines x” result is the one that counts.
- If no step produces “determines x”, but they still conflict, then the result of the algorithm cannot be determined.

Make sure that you under the difference between “supports x,” which provides evidence of a crisis or non-crisis war, and “determines x,” which provides proof.

Overview of the four steps in the evaluation

Here's a summary of the four steps:

Step 1: Evaluate Historical significance. If the war is historically significant, the result of the step is “Supports C”; if the war is near-forgotten, then the result of the step is “Determines N.”

Step 2: Determine intensity of genocidal violence. High genocidal violence gives the result “Determines C”; intermittent, stalemated or low-level violence gives the result, “Supports N.”

Step 3: Determine level of political considerations. If the war is highly politicized, the result is “Determines N”; if the pursuit of the war is non-political, the result is “Supports C.”

Step 4: Determine resolution. If the resolution of the war is a set of painful compromises designed to prevent future wars, the result is “Supports C”; if the resolution is that the victors impose punishment or reparations on the losers, the result is “Supports N.”

If you are a historian, you may find these steps puzzling, because they don't seem to correspond to anything you've seen before in the study of history.

But that's the point. Generational Dynamics is a brand-new discipline, and in particular a brand-new way of looking at wars. The steps summarized above do not make sense in the ordinary study of history, but they are crucial in the evaluation of crisis wars.

Step 1: Evaluating historical significance.

A crisis war must always be a historically significant war. If a war is not historically significant in a particular society or nation, then it can't be a crisis war for that society or nation. Therefore, the purpose of this first evaluation step is determine whether the war is historically significant for the society or nation being evaluated.

Some people have expressed to me their discomfort at calling a war that kills thousands of people a "near-forgotten war." I do not mean any disrespect to anyone killed in war, or to any individual who feels a particular war is significant. However, we're talking about a discipline here, a new discipline which has never been applied before, and it requires following certain rules.

Whether a war is "historically significant" or "near forgotten" depends on how recent the war is. For long past wars, you can refer to history books of the time and see what historians say about the war's significance, or whether they even mention it. If the war is more recent, you can take a poll of college students and ask if they know anything about it.

If you are unsure whether a war is "near forgotten," then treat the war as "historically significant," and go on to Step 2.

Here are some examples of evaluations of wars on their historical significance:

- The Mfecane is near-forgotten in America, which determines that it's a non-crisis war for America. But the Mfecane is very well known in the history of southern Africa, where it created the Zulu Empire in the early 1800s, so this war is historically significant in southern Africa, which supports (but does not determine) that it's a crisis war for southern Africa.
- The War of the Spanish Succession is very poorly remembered by the general public, even those familiar with history. However, if you refer to historians' descriptions of this war, you find that it set the boundaries of European nations for the entire 18th century, so it's a historically significant war for all European participants, which supports (but does not determine) that it's a crisis war for those participants.

- Except for the name, the Vietnam war is practically unknown to any American under 25. Even historians don't treat the war *per se* as important, outside of its impact on American politics. So the Vietnam War is a near-forgotten war in America, and so it's determined to be a non-crisis war for America. However, it's a major historical event for the Vietnamese, as they defeated a major world superpower, so it's a historically important war for the Vietnamese, supporting the "crisis war" evaluation for Vietnam.

Results of the evaluation of step 1:

- Historically significant war – supports C
- Near-forgotten war – determines N

Step 2: Determine intensity of genocidal violence

The determining factor for a crisis war is the visceral energy, the intensity of hatred, the genocidal fury, with which the war is pursued, especially as the war reaches its climax.

I often talk about crisis wars as being "genocidal," and I actually mean two different things by that. They're genocidal in the sense of wanting to destroy or exterminate one's enemy, but they're also genocidal in the sense of a willingness to risk one's own destruction. In World War II, America's D-Day invasion, as well as Germany's and Japan's unwillingness to surrender even when they were clearly lost, are examples of this kind of willingness to risk one's own destruction.

That can be measured for recent wars, but for historical wars, that kind of information may not exist. Hence, we have to look for clues in historical accounts that indicate what happened.

Here are some of the factors that indicate that a war exhibits this kind of genocidal violence:

- Highly secretive mobilization, with the intent to hide from other countries the war intention
- A massive surprise attack on the enemy
- A pursued desire for "ethnic cleansing"
- A sustained program of mass murders, mass rapes, massacres, torture, destruction of entire towns (with inhabitants), forced relocation of huge populations of people - sustained over a period of months (a single battle doesn't count)
- "Scorched earth policy" that kills as many civilians as possible, leaving the survivors to starve or die from exposure. This involves burning of villages, and destruction of wells and crops.

- Nation at end is “devastated” or perpetrates devastation
- A “D-Day” type mass assault, a willingness to sacrifice one's own forces for victory
- “Spiraling out of control”
- A refusal to capitulate, a willingness to fight to the death, even when defeat is almost certain

Here are some examples:

- World War II was genocidal for many reasons, including the reasons already given. To those we'd add the Allies' firebombing of Dresden and Tokyo, and the use of nuclear weapons.
- The War of the Spanish Succession climaxed with the 1709 battle of Malplaquet between England and France. This was the bloodiest war in Europe for the entire eighteenth century. The violence was so bad that statesmen of the time ended the war by signing The Treaty at Utrecht (1714), because they wanted to avoid for as long as possible another violent conflict such as the one that had just ended. In fact, there was no major war on the continent until the French Revolution, beginning in 1789.
- Note that a crisis war may begin slowly, with some political hesitation, and both participants may continue to hope that the war will be resolved peacefully. This clearly happened with America's Civil War. But a crisis war will gather energy as time goes on, leading to an extremely violent conclusion. It's the violence conclusion that's typical of a crisis war.

Caution: It would be nice if we could use “battle deaths” as an indication of genocidal fury, since that number is often easier to get than some of the other indicators. While it's true that a massive slaughter of civilians, especially when accompanied by rapes or a “scorched earth” policy, has got to be a crisis war, it's also true that a non-crisis war can kill a lot of soldiers, as World War I did across the static Maginot line; and conversely, a crisis war may fail to kill great numbers of people. All in all, it's the killing of civilians (mass murder of men and/or mass rape of women), rather than the killing of soldiers, that makes a crisis war. A massive forced relocation of an entire ethnic group of population, with the resultant torture and starvation, is also almost certainly a crisis war.

Note: A crisis war unites a country politically (think of President Bush hugging Dick Gephardt after 9/11). When a country's existence is in danger, or at least the country's way of life is in danger, then everyone unites to fight the common enemy. In the case of a crisis civil war, fought along an ethnic, religious or geographic fault line, each of the belligerents becomes united to fight the other belligerent.

Results of the evaluation of step 2:

- High genocidal violence - determines C
- Intermittent, stalemated, low-level violence - supports N

Step 3: Determine level of political considerations

Some wars are pursued for visceral feelings of fury and hatred, while others are pursued for purely political considerations. A judgment must be made of the level that politics plays in the conduct of the war.

Here are some factors that indicate that a war is highly politicized:

- Use of reasonable triggering political objectives for initial mobilization or termination (“we won't invade if you withdraw from Kuwait” or “we've driven you from Kuwait so we'll stop now”)
- Exogenous cause of the war (peace treaty, invasion by someone else)
- “Top-down war” - initiated by politicians with little sustained public support
- “Revanche,” rather than revenge
- Open and non-secret mobilization, without exceptional speed
- Strong antiwar or pacifist movement
- Lots of political controversy, little political unity
- Political pauses (such as “Christmas truces”)
- Stalemates
- Willingness to capitulate before necessary
- Desire to save lives rather than fight to the death

A war may be somewhat politicized at the beginning, but whether it's a highly politicized war depends on whether the politicization continues to the end.

Caution: Every war has a political objective. Actually, every war has multiple political objectives, including publicly stated objectives and secret objectives. The difference between a crisis and non-crisis wars is that a crisis war *unifies* the country politically, and a non-crisis war *divides* the country politically.

Note: A violent civil war along an ethnic, religious or geographic fault line must be a crisis war; a civil war along political lines (such as Caesar's “Rubicon” civil war) is a mid-cycle war.

Results of the evaluation of step 3:

- Highly politicized war – determines N
- Nonpolitical pursuit of war – supports C

Step 4: Determine the resolution of the war

Crisis wars change history; non-crisis wars do not.

If the first three steps have not been enough to make a crisis/non-crisis war determination, then the final test is how much the history of the society or nation under consideration was changed.

The predominant feeling after a crisis war, among winners and losers, is that “nothing like this must ever happen again.” This is distinctly different from a desire to reward the winner and punish the loser. A crisis war brings out the worst in people – torture, mass murder, rape, starvation, disease. Even the winners cannot be proud of having exhibited the most ugly, vicious human behavior possible. In a sense, everyone loses a crisis war.

The result is that the participants impose painful compromises – not to punish the losers, but to prevent another war of this type of war forever, or at least for as long as possible. These compromises may be imposed by the victor on the loser, or they may be imposed by international conference or treaty. Usually these compromises lead to substantial changes in the nature of the nation itself.

My experience is that this is among the weakest of indicators used to determine crisis from non-crisis wars, since it requires assessing political motivations. Nonetheless, it can provide additional support when other indicators are inconclusive.

Here are some examples among the West European crisis wars:

- The Peace of Westphalia (1648), also called the “Peace of Exhaustion” ended the Thirty Years War. It settled by treaty the boundaries between France and its ally Sweden on the one hand and the Habsburg possessions on the other hand. About 250 separate German states were recognized as sovereign.
- The Treaty at Utrecht (1714), ending the War of the Spanish Succession, which the statesmen of the time signed because they wanted to avoid for as long as possible another violent conflict such as the one that had just ended. Land possessions and boundaries were changed throughout Europe to achieve that end.
- The Congress of Vienna (1815) ended the Napoleonic Wars by rearranging over 300 political units (before 1789) to 38 states.
- The Franco-Prussian War (1870) ended a decade of wars that unified several German-speaking regions into a single German state.
- World War II ended with the creation of the United Nations, the partitioning of Germany, the partitioning of Palestine, and the partitioning of Kashmir, in order to settle regional disputes in those areas and remove the need for another war.

Note: When applying this rule to look for factors that imply a crisis war, look for a historic change that's important in the long run: The American Revolution expelled the British and created a new Constitution; the American Civil War abolished slavery; the English Civil War changed the relationship between King

and Parliament. However, it's sometimes difficult to evaluate something like a "historic change," and in those cases the results of this step are inconclusive.

Here are some examples of American non-crisis wars:

- The 1991 Gulf War drove Iraq out of Kuwait (*ravanche*), but the aftermath left Iraq with punitive reparations and restrictions, as well as constant overflights.
- The Vietnam War was a humiliating defeat for America in a non-crisis war, but with no permanent effect on the country; it was a crisis war for Vietnam that united the country under a single local government for the first time since the 1800s.
- The Korean War "ended" with an armistice that is still in effect today.
- World War I ended in the Treaty of Versailles whose purpose was to impose reparations on Germany and provide territorial awards to the winners.
- The Spanish-American non-crisis war ended with the Treaty of Paris that awarded Hawaii, the Philippines, Puerto Rico and Guam to America. From the point of view of Cuba, it was a crisis war that made Cuba an independent nation, no longer a colony of Spain.

Note: However, these evaluations often contain some ambiguities, and so this step should be used only if the previous steps produce ambiguous results. For example, some people might argue that WW I produced historic results for Germany because it gave birth to the Weimar Republic and because a peace treaty gave Alsace and Lorraine back to France. Those were not very historic changes, but the fact that it can be argued shows how difficult it is to apply this step. (WW I evaluates to a non-crisis war for Germany because of the politicization and early surrender.)

Note: A related difficulty in this rule is that it's sometimes difficult to evaluate "historic change" on a country by country basis. Thus, WW I *did* cause historic changes — the Bolshevik Revolution and the destruction of the Ottoman Empire, for example. However, those were Eastern European changes. As far as Germany is concerned, there was no historic change. But again, this kind of complication shows how difficult it is to apply this step.

Results of the evaluation of step 4:

- Painful, historic resolution to prevent future war: supports C
- Resolution imposes punishment or reparations: supports N

American Wars

This and the following sections provide some evaluations based on the preceding rules. In an effort to keep these evaluations completely "honest," based

on the evaluation algorithm just given, I've indicated with a "?" when I do not have enough historical information to complete a step. My experience is that every evaluation can be completed by consulting enough historical sources about the particular war.

The following are evaluations of American wars, with separate evaluations for other countries participating in the wars.

In each case, the war is evaluated based on the criteria given in the preceding sections. There is purposely no mention at all of cycles in the following evaluations, to make it clear that each war is being evaluated on its own, without reference to other wars.

The 1991 Gulf War. *America.* This war fizzled within a few weeks. The Americans defeated the Iraqi army, but there was no crushing climax. If this had been a crisis war, then the Americans would not have hesitated to smash into Baghdad and destroy Saddam Hussein's government, as well as Saddam himself. As it was, we just stopped fighting. This evaluates to a non-crisis war.

Historically significant war: forgotten - determines N
Genocidal violence: little - (supports N)
Politicization: high (determines N)

Iraq. The Iraqi army collapsed immediately, obviously having no will to fight. This evaluates to a non-crisis war.

Historically significant war: Uncertain
Genocidal violence: little - (supports N)
Politicization: high (determines N)

The Vietnam War *America.* This war fizzled as well. If America had wanted to win this war, it could have bombed much more aggressively, instead of being bound by antiwar politicians who imposed everything from Christmas truces to personnel restrictions. Americans "Vietnamized" the war, allowing us to back out, leaving South Vietnam in charge of its own defense. This evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: little - (supports N)
Politicization: high (determines N)

Vietnam. Now look at the Vietnam War from the North Vietnamese point of view, and you get quite a different picture. The North Vietnamese, led by Ho Chi Minh, exploded in fury as early as the 1968 Tet Offensive, and energetically

pounded the Americans and South Vietnamese, ruthlessly crushing the opposition. The Vietnamese War was a crisis war for North Vietnam, but a non-crisis war for America.

Historically significant war: significant - supports C
Genocidal violence: High - determines C
Politicization: Low - (supports C)

This makes the point that when you're evaluating wars, then you have to evaluate them from the point of view of all the major participants, since it may be a crisis war for some but not for all.

The Korean War *America*. Few people under age 50 know anything at all about this war, and that fact alone means that this could hardly be a crisis war. The war ended (or didn't end) in an armistice. This evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: little - (supports N)
Politicization: high (determines N)

Korea. From the Korean point of view, the war evaluates to a non-crisis war as well. Not only did this war not end in any kind of explosion, it technically didn't end at all, even though fighting stopped because of an armistice.

Historically significant war: significant - supports C
Genocidal violence: little - (supports N)
Politicization: high - determines N

World War II. *America*. It took several months for America to become fully mobilized after the Pearl Harbor attack, and in that sense World War II got off to a slow start for America. If WW II had been a non-crisis war like Korea or Vietnam, America would never have had the energy to mount the 1944 D-Day attack. America did mount that attack, showing how massive energy for war can build up. By 1945, America's vengeful fury was in full force, with the massive fire-bombing and destruction of Dresden and Tokyo, climaxing in the use of nuclear weapons on two Japanese cities. It's worth noting that nuclear weapons have never been used since then — and the reason is that no country since then has developed a nuclear capability and then had a crisis war. This evaluates to a crisis war.

Historically significant war: significant - supports C
Genocidal violence: high - determines C

Politicization: low - (supports C)

England. WW II was also a crisis war for England. England entered the war before America did, but it also got off to a slow start, with repeated warnings to Germany, and the famous "peace in our time" speech by Prime Minister Chamberlain. However England's efforts also gathered energy, and even exceeded America's efforts in some respects. By D-Day, the two countries were fully together. This evaluates to a crisis war.

Historically significant war: significant - supports C

Genocidal violence: high - determines C

Politicization: low - (supports C)

Germany. Hitler mobilized quickly and pursued the war vigorously. By 1944 it was clear he had lost, but he refused to surrender, and fought to the bloody end. This evaluates to a crisis war.

In evaluating whether WW II is a crisis war for Germany, we can also look at the issue of secrecy during mobilization. This is a secondary factor in evaluating wars, but it provides an additional indication. If an attacking country mobilizes in secret in order to attack with the greatest possible power and effect, this is a fairly certain sign of a crisis war. However, it's not completely certain, because even some non-crisis wars are pursued with some initial secrecy.

Historically significant war: significant - supports C

Genocidal violence: high - determines C

Politicization: low - (supports C)

Japan. Like Germany, Japan refused to surrender even when loss was certain. And like Germany, Japan mobilized for war in secret for a surprise attack on Pearl Harbor.

Historically significant war: significant - supports C

Genocidal violence: high - determines C

Politicization: low - (supports C)

Russia. Evaluating WW II for Russia is a surprise for many people because it's not a crisis war.

Russia suffered enormously in what they called the Great Patriotic War, but Russia had had a brutal crisis war just a few years earlier, in the 1910s and 1920s. They were war-weary and had little of the genocidal energy necessary to pursue a crisis war.

Like England, Russia had made peace with Hitler, and expected “peace in our time.” But unlike England, Russia did not declare war against Hitler until after Hitler had already begun its invasion. Stalin even sought help from the Russian Orthodox Church, helping to revive what had been destroyed just 20 years earlier. Russians in Stalingrad (Saint Petersburg) and Leningrad suffered massive starvation from German encirclement, but it took until 1944 for the Russian army to finally expel the Germans. At that point, Russia was ready to stop fighting, but the Allies wanted Russia to keep on fighting to help defeat Germany. Josef Stalin achieved a tremendous political victory at the Yalta conference in 1945, where he allowed Churchill and Roosevelt to “convince” him to keep on fighting, in exchange for hegemony over Eastern Europe. Stalin also promised to declare war against Japan, but he didn't do so until several days after America had already dropped a nuclear weapon.

So there was no explosion of violent energy from Russia. Like many non-crisis wars, this one was fought defensively and politically. That's why it's not a crisis war for Russia.

Historically significant war: significant - supports C

Genocidal violence: low to moderate - supports N

Politicization: High - determines N

World War I. *Germany.* World War I began in the Balkans and spread to Austria. Germany was pulled into it because of a treaty with Austria. Russia supported its ally Serbia, and Germany attacked France because France had a treaty with Russia.

Germany pursued the war as almost a comedy of errors. There was constant vacillation. First they were going to encircle Paris, but then they moved forces from the east to the western front, so they stalemated in France. Then in the west they fought well, but they didn't bother to fully coordinate with their Austrian allies – in effect allowing individual egos to take precedence over the war. At the end, Germany capitulated because of internal political problems, while German troops were still deep into France. [Schivelbusch, 189-90] Germany had little energy throughout this war, and so it evaluates as a non-crisis war.

Historically significant war: significant - supports C

Genocidal violence: low - supports N

Politicization: High - determines N

England and America. England was pulled into the war to prevent Germany from overrunning France, as had happened in 1869. One of the most dramatic indications of how little energy there was the 1914 Christmas truce – four months after the war began, the English and German front line troops took time

off on Christmas eve to drink beer and sing Christmas carols together. Allies' participation ended with German capitulation, while German troops were still deep into France. There was no explosive violence at the end, so it evaluates as a non-crisis war.

Historically significant war: significant - supports C

Genocidal violence: low - supports N

Politicization: High - determines N

Russia. Americans seldom realize that World War I was mainly an East European and Middle Eastern war, and only touched Western Europe incidentally (even though many lives were lost).

Russia's management of the war was disastrously wild and frenzied, and it led to one humiliating defeat after another. The 500-year-old tsarist government collapsed, leading to the Bolshevik (Communist) revolution of 1917, and the Russian Orthodox Church was reduced to near wreckage. Russia pulled out of WW I, but then succumbed to a massive civil war, resulting in tens of millions of deaths by 1928.

When you're evaluating where a war was a crisis war for a given nation, you sometimes need to look beyond the war itself. Russia's participation in World War I might not, *per se*, evaluate to being a crisis war. But when you look at the entire **crisis period**, beginning in 1914 with World War I and ending in 1928 after the civil war, you get an extremely violent, explosive picture.

When examining the violent, genocidal energy that accompanies a crisis war, think of this energy as a fire hose that a nation can turn on anyone, and can also turn on itself.

A crisis period generally lasts 10 to 20 years. Sometimes it begins and remains explosive in one region. In other cases, it begins slowly in one region and grows explosively in the same region. In other cases, the war starts out slowly in one region, but then explodes into a completely different region, and even a civil war, as happened here. All of these must be taken into account.

Historically significant war: significant - supports C

Genocidal violence: high - determines C

Politicization: Low - supports C

Turkey / Ottoman Empire. Turkey began with a war against Russia, but had a violent civil war with its own Armenian population. By 1922, the centuries-old Ottoman Empire had been completely destroyed. This evaluates to a crisis war period.

Historically significant war: significant - supports C

Genocidal violence: high - determines C
Politicization: Low - supports C

Spanish-American War (1898). *Cuba.* The Cuban War of Independence (1895-98) ruthlessly devastated the island, killing 10% of the population. [Stearns, 638] This evaluates to a crisis war for Cuba irrespective of American intervention.

Once again, we see that we have to go beyond a single war to examine an entire crisis period.

Historically significant war: significant - supports C
Genocidal violence: high - determines C
Politicization: Low - supports C

America. The Cuban war aroused public sympathy for the rebels, against Spain. When the U.S.S. Maine mysteriously blew up in 1898, America declared war against Spain and the Spanish Fleet. One of the operations was a blockade of Cuba, something that was repeated in 1962. Spain withdrew from Cuba. [Stearns, 614] This evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: no - supports N
Politicization: High - determines N

Spain. After the Maine exploded, Spain immediately agreed to all American demands, hoping to avoid war. [Stearns, 614] When war occurred, Spain was discredited, causing political problems. [Stearns, 496] This evaluates to a non-crisis war.

Historically significant war: ?
Genocidal violence: no - supports N
Politicization: High - determines N

Civil War (1861-65). The Civil War got off to a slow start, as both sides continued hoping for a peaceful compromise. The war became decisive with the Emancipation Proclamation of 1863, which signaled a change in attitude. 50,000 men were killed or wounded in the Battle of Gettysburg in July. In March 1864, Sherman destroyed Atlanta and then marched to the sea, ravaging everything in his path. This evaluates to a crisis war.

Historically significant war: significant - supports C

Genocidal violence: yes - determines C

Politicization: low - supports C

Mexican-American War (1846-48). American troops seized California and Monterrey, and occupied Mexico City. There was a huge antiwar movement [Almanac 251]. The war ended as Mexico ceded Texas and other territories to the U.S., and the U.S. agreed to pay \$15 million in return. [Stearns 605, 637] This evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: no - supports N

Politicization: high - determines N

Mexico. Mexico was invaded and occupied by American forces, and dealt with several internal uprisings, including a war with Mayan Indians in the Yucatan, culminating in a massive peasant revolt in Queretaro. [Stearns 637] This really requires deeper information from other sources, but based on this information it evaluates to a crisis war.

Historically significant war: significant - supports C

Genocidal violence: yes - determines C

Politicization: low - supports C

War of 1812. America declared war on England because England was restricting American shipping to Europe during the Napoleonic Wars. The war was indecisive and ended when the Napoleonic wars ended. The 1814 Treaty of Ghent restored the *status quo ante*. This evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: no - supports N

Politicization: high - determines N

England. England was engaged in the Napoleonic crisis war. England tried initially to avoid war by agreeing to America's demands, but war began anyway because of a miscommunication. England pursued the war energetically, even to capturing and burning Washington D.C. at approximately the same time that France was capturing and burning Moscow. Both England and France lost these forays, in both cases because they were eventually overwhelmed by native (American and Russian) forces. Even so, this is part of the Napoleonic wars, and evaluates to a crisis war for England.

Historically significant war: significant - supports C
Genocidal violence: yes - determines C
Politicization: low - supports C

Revolutionary War. The colonists fired the “shot heard 'round the world” and changed history. This evaluates to a crisis war.

Historically significant war: significant - supports C
Genocidal violence: ?
Politicization: low - supports C

England. The British should have won. They had many more soldiers and vastly greater provisions. But even when they saw the war coming, they didn't requisition provisions to fight the war. There was a powerful antiwar movement in England opposed to the war. In the end, British General Cornwallis let himself be encircled at Yorktown, and then surrendered with 7,000 men. England immediately established trading relations with America. Evaluates to a non-crisis war.

Historically significant war: significant - supports C
Genocidal violence: no - supports N
Politicization: high - determines N

Sources

The following sources were used in the above evaluations, as well as the following evaluations:

[Almanac] Arthur M. Schlesinger Jr., general editor, *The Almanac of American History, Revised and Updated Edition*, Barnes & Noble Books, 1993

[Braudel] Fernand Braudel, *A History of Civilizations*, 1963, translated by Richard Mayne, Penguin Books, 1993.

[DK] Jeremy Black, general editor, *DK Atlas of World History*, Dorling Kindersley Publishing Inc., 2001

[Stearns] Peter N. Stearns (Editor), *The Encyclopedia of World History, 6th edition*, Houghton Mifflin Co., 2001

[Trevelyan] George Macaulay Trevelyan, *A Shortened History of England*, Penguin Books, 1942

[Roberts] J. M. Roberts, *The Penguin History of the World*, Penguin Books, 1995

[Schivelbusch] Wolfgang Schivelbusch, *The Culture of Defeat: On National Trauma, Mourning, and Recovery*, 2000, translated by Jefferson Chase, Metropolitan Books, Henry Holt and Company LLC, 2001

French Religious Wars

This is an analysis of the French religious wars from 1467 to 1714. This evaluation came out of a lengthy online discussion where I was challenged to show that my methodology applied to these wars.

Each war is evaluated honestly, with no reference to cycles. However, more work really needs to be done to fill in some blanks.

Louis XI defeats Charles the Bold (1467-1491). Louis united Burgundy, Anjou, Provence and other provinces with the French crown. Needs more information, but appears to evaluate to a crisis war which merged together the timelines of several provinces.

Historically significant war: significant - supports C

Genocidal violence: ?

Politicization: ?

Charles VIII's expedition to Italy (1495-6). Charles conquered Naples, but quickly withdrew. Evaluates to non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: low - supports N

Politicization: ?

Invasion of Emperor Maximilian (1513). Battle of the Spurs named after the hasty flight of the French. [Stearns] Evaluates to non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: low - supports N

Politicization: high - determines N

French-Habsburg wars (1515-59). "Charles V, Emperor from 1519-56, ruled Spain, Flanders, and much of Italy as well as the Habsburg lands of Central Europe. He was opposed by the German princes, especially the Protestant ones, and Francis I and Henry II of France, who pursued the claims of their predecessors to Italy. Constant wars wasted many lives and much money, but gained

nothing. In 1556, Charles V abdicated, dividing his empire between his brother and his son." [DK Atlas, p. 194] This evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: ?
Politicization: ?

Religious Wars (1562-98). In analyzing a period this long, 36 years, I would look for a climax - something that's clearly remembered, and changed history. There are two candidates: St. Bartholomew Night's massacre (1572) and the Edict at Nantes (1598). So, it makes sense, at least for purposes of investigation, to split this long period into two parts.

Religious Wars Part I (1562-73). There were several wars between the Catholics and Huguenots (Protestants) during the 1560s, with an increasing level of conflict and acts of brinkmanship. In 1572 a decision was made to kill all the Huguenot leaders. This led to the Massacre of St. Bartholomew on August 24, 1572, when Catholics massacred some 1,000 to 2,000 Huguenot civilians in Paris in a single night. During the next two months, some 10,000 to 100,000 civilian Huguenots were slaughtered throughout the country, often in their own homes. This massacre is an important event in history to this day. This evaluates to a crisis war.

Historically significant war: significant - supports C
Genocidal violence: high - determines C
Politicization: low - supports C

Religious Wars Part II (1573-98). After 1573, with their leaders killed, the Huguenots reorganized into a political organization, and the war turned into a "permanently organized revolt." [[<#stdurl www.newadvent.org/cathen/07527b.htm#>](http://www.newadvent.org/cathen/07527b.htm#)]. The wars ended with a political document, the Edict at Nantes, which granted freedom of worship to Huguenots. This evaluates as a non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: low - supports N
Politicization: high - determines N

France in 30 Years War (1635-48). The war ended with the Peace of Westphalia, agreed in 1648. It was called the "Peace of Exhaustion" by its contemporaries. It settled by treaty the boundaries between France and its ally Sweden on

the one hand and the Habsburg possessions on the other hand. About 250 separate German states were recognized as sovereign. This evaluates as a crisis war.

Historically significant war: significant - supports C

Genocidal violence: high - determines C

Politicization: low - supports C

The Fronde (1648-53). The nobility revolted against Cardinal Mazarin. The Fronde ended and Mazarin returned to power. Little had changed. [Stearns 326] Evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: low - supports N

Politicization: high - determines N

Second Anglo-Dutch War (1666-67). France allied with Holland. Ended with restoration of territories. [Stearns 328] Evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: low - supports N

Politicization: high - determines N

War of Devolution (1667-68). Louis XIV's war with Spain over his wife's inheritance. Settled by Treaty of Aix-la-Chapelle. [Stearns 328] Evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: low - supports N

Politicization: high - determines N

War against the Dutch (1672-78). Settled by Treaties of Nimwegen, which divided up the region, with gains by France. [Stearns 315] Evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: low - supports N

Politicization: high - determines N

Invasion of Spanish Netherlands (1683-84). Temporary truce in 1684. [Stearns 315] Evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: low - supports N
Politicization: high - determines N

Revocation of the Edict of Nantes (1685). There was no war.

War of the League of Augsburg (1688-97). Louis tried to prevent the success of the Glorious Revolution. France was engaged on all her land frontiers in operations against Spain, Holland, and the German Princes, and even so she held her own; neither side won any sensational victories. Ended with the indecisive Treaty of Ryswick. [Trevelyan, 363-64, 369] Evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: low - supports N
Politicization: high - determines N

War of the Spanish Succession (1701-14). France began the war with every apparent advantage except sea power, already holding vast territories when the war began. "But contrary to all expectation, the allies, who in the previous war had seemed no painful inch to gain, chased the French out of every one of these lands with the exception of Spain. These tremendous victories, as compared to the stalemate of the previous war, can be accounted for in no small degree by the military genius of Marlborough...." [Trevelyan, 370] The war ended with Treaty at Utrecht, which defined many of the borders of Europe that hold to this day. Western political geography was thus set for a long time, owing much to the need felt by all statesmen to avoid for as long as possible another conflict such as that which had just closed. For the first time a treaty declared the aim of the signatories to be the security of peace through a balance of power. [Roberts, 584-86] This evaluates to a crisis war.

Historically significant war: significant - supports C
Genocidal violence: high - determines C
Politicization: low - supports C
Resolution: Treaty at Utrecht - supports C

19th century wars of Southern Africa

The following identifies crisis wars in Southern Africa starting in 1817. **This work is far from complete.** Many of the wars have been identified, and the crisis

wars have been tentatively identified as the Mfecane and the Anglo-Boer war. But these evaluations require additional sources and evaluations before we can be certain.

The Mfecane - The Crushing (1817-28)

The Zulus were a tribe in the northern portion of what is now South Africa. The Zulus went from obscurity to world reknown as a result of Shaka, born in 1787, who became the tribal chief in the early 1800s.

Shaka revolutioned tribal warfare: "During his reign he revolutionized warfare ... by replacing the throwing spear with the stabbing assegai and by developing radical new tactics. Use of the short, stout assegai meant that warriors could no longer throw their spears and run, but had to close with their foes. His army in fighting formation was likened to the head of an ox; from either side of the main body came "horns," troops that ran ahead to envelope the enemy. He organized his regiments by age groups; no man could marry until he had washed his assegai in the blood of an enemy. Footwear was forbidden, and to make sure his warriors' feet were tough, he required them to dance on thorns; those whose dancing was not vigorous enough were clubbed to death." [Byron Farwell - college.hmco.com/history/readerscomp/mil/html/mh_059900_zuluandthezu.htm #>].



Shaka's stabbing assegai is on top, contrasted with the throwing spears on the bottom

(This picture shows Skaka's stabbing assegai on the top, contrasted to the throwing spears on the bottom.)

Leading an army of 40,000 to 80,000 warriors in the early 1800s, Shaka merged with or conquered a number of nearby tribes, killing more than a million men, and by 1818 became Emperor Shaka the Great, head of the Zulu Kingdom. At the point, the Mfecane began in earnest. Genocidal warfare broke out among the tribes that the zulus had defeated, turning much of the region into a wasteland. This evaluates to a crisis war.

- Historically significant war: significant - supports C
- Genocidal violence: high - determines C
- Politicization: low - supports C

Zulu vs Boer Voortrekkers (1837-38). Zulus kill Boer Voortrekkers in a meeting, and also also attacked trekker encampments. Other Boers defeated

Zulu army, and created the Republic of Natal. [Stearns] Evaluates to a non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: low - supports N
Politicization: ?

British vs Boers in Natal (1842-43). British annexed Natal. Evaluates to non-crisis war.

Historically significant war: near-forgotten - determines N
Genocidal violence: low - supports N
Politicization: ?

Zulu kingdom civil war (1856). "Civil war in Zulu kingdom established the supremacy of the Usuthu faction and the right to succession of Cetshwayo, while Mpande remained king." [Stearns] This needs more information, since civil wars are sometimes hard to evaluate. In this case, it sounds like the civil war was led from the top, rather than from the people. Evaluates to a non-crisis war.

Historically significant war: ?
Genocidal violence: ?
Politicization: ?

Orange Free State vs Sotho (1865-66). "War between the Orange Free State and Moshoeshoe's Sotho resulted in cession of most of Sotho state's arable land." Evaluates to a non-crisis war.

Historically significant war: ?
Genocidal violence: ?
Politicization: ?

Ndebele civil war (1868-71). "Lobengula became Ndebele king after a civil war over succession to Mzilikazi." I really need more information about this war.

Historically significant war: ?
Genocidal violence: ?
Politicization: ?

Last Cape-Xhosa war (1877-78). The last Cape-Xhosa war resulted in famine and defeat for the Xhosa. More information needed.

Historically significant war: ?

Genocidal violence: ?

Politicization: ?

British vs Zulu kingdom (1879). Zulus attacked British, British win decisive victory after rushing in reinforcements. [This is like the Gulf War after Iraq invaded Kuwait.] Evaluates to non-crisis war.

Historically significant war: near-forgotten - determines N

Genocidal violence: ?

Politicization: ?

Zulu civil wars (1879-87). Defeat by British led to a series of civil wars in the former kingdom. British annexation of Zululand in 1887. Need more information because there may be a partially diverged timeline for the zulus since the Mfecane.

Historically significant war: ?

Genocidal violence: ?

Politicization: ?

Boer revolt against British (1880-81). After four months, British recognized the republic in the Treaty of Pretoria. Evaluates to a non-crisis war.

Historically significant war: Forgooten - determines N

Genocidal violence: ?

Politicization: Yes - supports N

South African War / Anglo-Boer War (1899-1902). "At the outset, Boers had the military advantage of numbers and knowledge of terrain. Britain had only 25,000 men available. By Feb. 1900, the tide of battle favored British forces. By November, the Boers turned to guerrilla tactics, frustrating British army strategy. In Jan. 1901, Gen. Herbert Kitchener used a scorched earth policy to counter Boer guerrillas. Some 120,000 women and children were confined in concentration camps, where poor sanitation and malnutrition contributed to high mortality (around 20,000 died). British journalist J. A. Hobson, covering the war, developed a new theory of imperialism. At the end of the war, the British had 300,000 troops in South Africa against 60,000-70,000 Boers. By the Treaty of Vereeniging (May

31, 1901) the Boers accepted British sovereignty but were promised representative government. The British promised 3 million to enable the Boers to rebuild their farms." [Stearns] Evaluation: This is very much like the Vietnam war, with heavy British antiwar sentiment, except that the Brits were able to overwhelm the Boers with massive reinforcements. This evaluates to a non-crisis war for the British and a crisis war for the Boers.

Historically significant war: Yes - Supports C

Genocidal violence: Yes - determines C

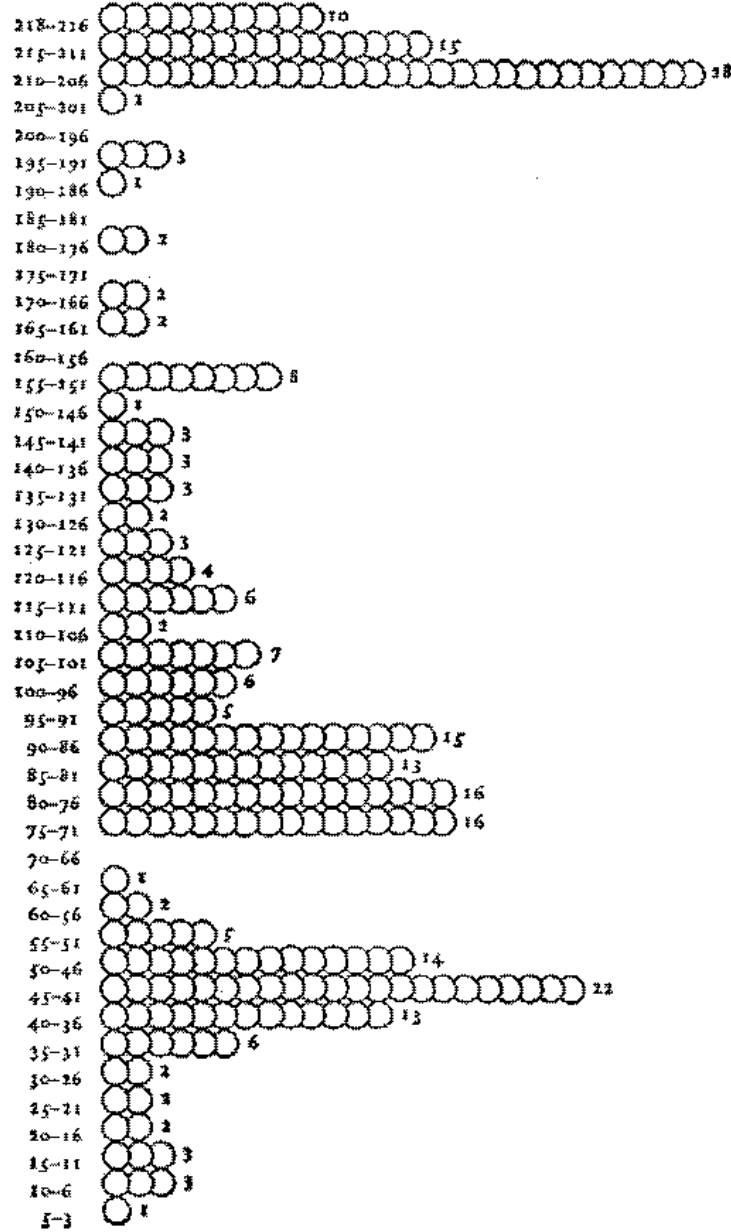
Politicization: Low - supports C

Roman Crisis Wars from Buried Coin Hoards

This is an analysis of three Roman periods, based on evidence from buried coin hoards.

This came about because a reader of my book challenged it on the basis that Rome didn't follow the 80-year timeline. As evidence, he provided the following page from a book, Michael Crawford, *The Roman Republic*, 2nd Edition, Harvard University Press, 1993, p. 162:

THE ROMAN REPUBLIC



10 Coin hoards from Italy, Corsica, Sardinia and Sicily. The table plots the closing dates of known coin hoards in five year periods; the correlation between concentrations of coin hoards not recovered by their owners and periods of war and disturbance is very close.

Papers of the British School at Rome 1969, 79

This table shows how many Roman coin hoards were found with coins in various four year periods. During times of war, people tend to bury their gold coins for safety, and come back for them later. Thus, the number of gold coin hoards tells us when the wars were.

The person challenging my book pointed out that the three periods with highest activity were 218-201, 91-64, and 55-35. He said that these periods did not run in 80 year cycles, proving that my book must be wrong.

I did an analysis, and found that the first two are crisis periods, but the third is an awakening period, which is consistent with Generational Dynamics.

This indicates that coin hoards were buried during awakening periods as well as crisis war periods.

Here's a summary of the analysis:

Second Punic War (218-201 BC). Hannibal marched his Carthaginian army through southern France and headed for Rome, defeating one Roman army after another along the way. The war raged on for years, until 202 when Hannibal's army was annihilated. Carthage was to accept Rome's terms of surrender, and the unfaithful Italian allies were punished as well. Evaluates to a crisis war.

Historically significant war: Yes - Supports C

Genocidal violence: Yes - determines C

Politicization: Low - supports C

Social War, Civil War, Mithridatic Wars (91-64 BC). Italian allied states formed their own republic, Italia, and declared war on Rome. Rome attempted to undermine Italian solidarity by extending Roman citizenship to all Italians (unraveling strategy), but the war continued. Before the war was over, 50,000 had died on each side and Italy was devastated. [Stearns] A further civil war in Rome resulted in much further bloodshed. This evaluates to a crisis war.

Historically significant war: Yes - Supports C

Genocidal violence: Yes - determines C

Politicization: Low - supports C

Rioting in Rome, Civil War, Caesar assassinated (55-35 BC). Caesar "crossed the Rubicon" and thus initiated a short-lived civil war. Caesar made Cleopatra ruler of Egypt – gender issues are often important during awakening periods. Caesar carried out other foreign campaigns, achieved power in Rome, and was assassinated in 44. This evaluates to a non-crisis war.

Historically significant war: No - determines N

Genocidal violence: No - supports N

Politicization: High - determines N

Resolution: Fizzled - supports N

Problems for review and research

- The phrase “forgotten war” has been criticized as having no meaning in history, and yet there's no doubt that there are many war that are forgotten in all but name, and sometimes even the name is forgotten. How can this concept be redefined so that it's more meaningful to historians?
- The next chapter lists dozens of crisis wars throughout history. Choose a period of history and apply the crisis war algorithm to all the wars in that period. Determine whether or not the crisis wars have all been correctly identified.

Chapter 9 - List of Crisis Wars

This table shows, in each case, the date of the climax of the crisis war, and the date and number of years to the beginning of the next crisis war. Thus, this is a table of crisis war lengths, mid-cycle lengths and total seculum lengths.

The average mid-cycle length is 67 years. The average saeculum length (beginning of one crisis war to beginning of next) is 79 years.

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There are a few mid-cycle periods less than 50 years, all in ancient and medieval times. The minimum was 42 years. More research is needed to identify why such periods occur. My theory is that they're all due to unexpected invasions or from the merging of two regions and corresponding timelines. For example, if you take the Byzantine Empire, centered in Constantinople, a central crossing point surrounded by Persia, Russia, Europe and Arabia, then it's reasonable to expect that not everyone followed the same crisis war schedule.

This is an honest list, in the sense that I identified crisis wars using the criteria that I've described. However, there were some cases when I really needed more information from other sources, and in those cases I sometimes cherry-picked to get the list completed. I would guess that there are probably four or five errors in this table, but they can all be fixed with more information. At any rate, there's a good chance that any errors will cancel each other out in determining distribution of mid-cycle lengths.

---Length in years---

Crisis War, Beginning, Climax War Mid-cycle Total
Period

America

King Philip's War	1675	1678	3	97	100
Revolutionary War	1775	1782	7	79	86
Civil War	1861	1865	4	76	80
WW II	1941	1945	4		

England

Norman conquest	1064	1066	2	69	71
Civil war	1135	1154	19	50	69
War: Normandy	1204	1215	11	61	72
Civil war / Wales	1276	1284	8	54	62

CHAPTER 9 - LIST OF CRISIS WARS

Hund Yrs War begin	1338	1346	8	109	117
War of the Roses	1455	1485	30	74	104
Armada	1559	1588	29	50	79
Civil War	1638	1650	12	51	63
War Spanish Succ	1701	1714	13	79	92
French Rev / Napol	1793	1814	21	51	72
Franco-Prussian	1865	1870	5	68	73
WW II	1938	1945	7		

Normandy / France

Conquer England	1064	1066	2	58	60
Louis VI	1124	1135	11	47	58
3rd Cru / Civil w	1182	1204	22	66	88
Louis' 2nd crusade	1270	1285	15	53	68
Hund Yrs War begin	1338	1346	8	69	77
Hund Yr War redress	1415	1430	15	45	60
Unification France	1475	1480	5	82	87
St. Bartholomew	1562	1572	10	63	73
30 Years War	1635	1648	13	53	66
War Spanish Succ	1701	1714	13	75	88
French Rev / Napol	1789	1814	25	51	76
Franco-Prussian	1865	1870	5	68	73
WW II	1938	1945	7		

Germany

Peace at Augsburg	1540	1555	15	63	78
30 Years War	1618	1648?	30	53	83
War Spanish Succ	1701	1714	13	79	92
French Rev / Napol	1793	1814	21	51	72
Franco-Prussian	1865	1870	5	68	73
WW II	1938	1945	7		

Spain

Muslim conquest	711	715	4	62	66
Charlemagne invades	777	801	24	51	75
Muhammad v Xians	852	861	9	101	110
al Mustansir	962	970	8	57	65
End Umayyad caliph.	1027	1031	4	49	53
Annex Moorish Spain	1080	1086	6	58	64
Almohades invasion	1144	1150	6	45	51

Alfonso reconquest	1195	1212	17	100	117
Repel Muslims	1312	1340	28	51	79
Xians vs Jews	1391	1420	29	59	88
Inquisition/Reconq	1479	1492	13	68	81
Armada battle	1560	1588	28	52	80
Revolt in Catalonia	1640	1659	19	42	61
War of Span. Succ.	1701	1714	13	79	92
French Rev / Napol.	1793	1814	21	54	75
Spanish Republic	1868	1874	6	62	68
Spanish Civil War	1936	1939	3		

Japan

Meiji Restoration	1852	1868	16	73	89
WW II	1941	1945	4		

Ancient Greece

Persian Wars	-507	-490	17	59	76
Peloponnesian War	-431	-404	27	47	74
Macedonian conquest	-357	-338	19		

Ancient Palestine

King Herod Terror	-	-4	-	69	-
Jerusalem Massacre	66	71	5	42	47
Parthian War	113				

Ancient Mecca

Pagan wars	592?	-	64	64	
Muslim civil war	656	665?	9		

Ancient Rome

Second Punic War	-218	-201	17	52	69
Third Punic War	-149	-146	3	55	58
Social/Civil War	-91	-82	9	46	55
War with Egypt	-36	-30	6	92	98
War with Christians	63	71	8	42	50
Parthian War	113	117	4	76	80
Severan Wars	193	211	18	113	131
Empire reunited	324	337	13	69	82
Rome sacked	406	410	4	117	121
Byzantine War	527				

Byzantine Empire

First Persian War	527	531	4	91	95
Defeat of Persians	622	630	8	65	73
Revolt/Anarchy	695	715	20	63	83
Expel Muslims	778	779	1	81	82
Constantinople att	860	863	3	57	60
Russian Armada	920	941	21	55	76
Annihilate Bulgaria	996	1014	18	57	75
Revolt v throne	1071	1081	10	108	118
Crusades/Constantin	1189	1204	15	55	70
Reconquest	1259	1261	2	80	82
Civil War	1341	1347	6	75	81
Ottoman conquest	1422	1453	31		

Ottoman Empire

Constantinople fall	1453	-	59	-	
Conquer Syria/Egypt	1512	1520	8	73	81
War with Habsburgs	1593	1606	13	77	90
War w/Holy League	1683	1699	16	69	85
War with Russia	1768	1774	6	79	85
Crimean War	1853	1856	3	52	55
Destruction	1908	1922	14		

Egypt

Fatimid dynasty	969	-	54	-	
Mirdasid dyn/Syria	1023	1023	0	56	56
Seljuk Tutush reign	1079	1095?	16	79	95
Saladin's reunifica	1174	1185	11	65	76
Malmuk empire	1250	1261	11	86	97
Black Death	1347	1349	2	51	53
Timur-I Lang invade	1400	1401	1	111	112
Ottoman conquest	1512	1520	8	66	74
Revolt ag. Ottomans	1586	1609	23	102	125
Civil War	1711	1711	0	75	75
Muhammad Ali	1786	1811	25	65	90
Rev + English occup	1876	1882	6	66	72
Egyptian Revolution	1948	1954	6		

Russia

Defeat of Tartars	1360	1380	20	82	102
Annex Novgorod	1462	1485	23	72	95
Livonian War	1557	1582	25	67	92
Peasant rebellions	1649	1670	21	92	113
Ottoman/Pugachev	1762	1783	21	70	91
Crimean/Emancipate	1853	1861	8	54	62
Bolshevik Revol	1915	1928	13	65	78
Soviet collapse	1993	1993	-	-	-

(Saudi) Arabia

Wahhabi state	1745	-	55	-	-
War with Ottomans	1800	1818	18	84	102
Ibn Saud conquest	1902	1925	23	-	-

Morocco

Rif War	1921	1927	7	-	-
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Algeria

Rebel v Ottomans	1803	1808	6	52	58
Awlad Sidi Shaykh	1864	1883	19	71	90
War - independence	1954	1962	9	-	-

Iran

Safavid dynasty est	1501	1524	23	54	77
War with Ottomans	1578	1590	12	58	70
Afghan/Jew persecut	1648	1662	14	60	74
Afghan/Russia wars	1722	1736	14	68	82
War with Russia	1804	1813	9	93	102
Constitutional Rev	1906	1909	3	71	74
Iran/Iraq War	1980	1989	9	-	-

Iraq

Great Iraqi Rev.	1914	1920	6	60	66
Iran/Iraq War	1980	1989	9	-	-

Vietnam

French Indochina	1885	1895	10	70	80
Indochina War	1965	1980	15	-	-

China

White Lotus Rebel	1795	1805	10	46	56
Taiping Rebellion	1851	1864	13	68	81
Mao/Chiang civil war	1932	1949	17		

Colombia and Venezuela

War of Independence	1811	1822	11	77	88
War of a 1000 Days	1899	1902	3	46	49
La Violencia	1948	1960	12		

Mexico

Mexican-Amer War	1846	1848	2	63	65
Mexican Revolution	1911	1924	13		

Philippines

Civil wars	1755	1762	7	58	58
Civil war	1820	1823	3	73	76
Philippine revolut	1896	1898	2	43	45
World War II	1941	1945	4		

Problems for review and research

- Choose other periods of history not covered in this chapter and identify the crisis wars.
- In particular, choose a region of Africa and identify the crisis wars for the last few centuries.
- In the above list, the average mid-cycle period is 67 years. 42 years is the minimum, and 117 years is the maximum. Do a historical analysis and determine why some mid-cycle periods are very short, and some are very long. One hypothesis: Short mid-cycle periods are associated with unexpected crisis events, such as an unexpected invasion; long mid-cycle periods contain associated crisis wars in other nations or regions.
- The Franco-Prussian war is given as a crisis war for England, even though England didn't participate. On the other hand, England was at war somewhere in the world every single day of Queen Victoria's long reign. What is your crisis war analysis of 1800s England?
- Generational Dynamics predicts there will be a new West European "world war." Will France and England be at war again with each other,

as have been so many times in the last millennium? If so, which countries will side with France, and which with England?

- In the expected “clash of civilizations” world war, which Muslim countries, if any, will side with the West?

Chapter 10 - Strauss and Howe's Fourth Turning Model

This chapter is directed at those who have studied the Fourth Turning generational model developed by William Strauss and Neil Howe. The chapter describes in detail how the Generational Dynamics model differs from the Fourth Turning model.

Generational Dynamics is based on work done by historians William Strauss and Neil Howe in the 1980s and early 1990s on generational changes in Anglo-American history.

Their work is documented in two books, www.amazon.com/exec/obidos/ASIN/0688119123 "*Generations: The History of America's Future, 1584 to 2069*"# and www.amazon.com/exec/obidos/tg/detail/-/055306682X "*The Fourth Turning: An American Prophecy*"#.

Strauss and Howe's work develops a generational theory that applies to what they call "the Anglo-American timeline," described in *The Fourth Turning*.

The generational theory developed by Strauss and Howe is brilliant, and forms the basis of Generational Dynamics. Although Generational Dynamics corrects some errors in the Fourth Turning theory, nonetheless Generational Dynamics still borrows heavily from the theories developed by Strauss and Howe in the Fourth Turning in many places. Furthermore, the two theories produce nearly identical results for the times and places that the Fourth Turning covers – Anglo-Saxon periods since the War of the Roses. The phrase "fourth turning" refers to a crisis period, an approximately 20-year period in which a crisis war occurs. Thus, a "fourth turning" and "crisis war" can be considered to be roughly equivalent.

In order to expand The Fourth Turning so that it applies beyond the Anglo-American timeline restriction, it's been necessary to make some corrections and modify and expand it in a number of ways. The resulting Generational Dynamics theory applies to all nations at all times.

In the following sections, we'll summarize the Strauss and Howe theory, and we'll explain where Generational Dynamics differs.

I'll use these abbreviations:

"The GD theory," or just GD, refers to the Generational Dynamics theory.

“The TFT theory,” or just TFT, refers to The Fourth Turning theory. (To anticipate a question, I’m going to do this even though I know the first T in TFT stands for “The.”)

I wish to make it clear that although this chapter is lengthy, that doesn't mean that there many problems with the original TFT theory. All it really means is that I've taken advantage of a few issues as a launching pad for fairly lengthy discussions of generational theory. The work by Strauss and Howe is brilliant and seminal. Not only could I never have developed this theory without having first read their work, but in fact I still refer to their books today to gain their perspective on many issues.

Summary of The Fourth Turning theory

The Fourth Turning (TFT) theory is based on work that William Strauss and Neil Howe began in the 1980s. In doing some marketing consulting in the 1980s, they noticed that people differed dramatically based on what generation they were in. They found that people who fought in World War II were quite different from people who were *raised* during World War II, and that those were quite different those who grew up *after* World War II.

They found that the similarities among people in the same generation outweighed the individual differences, and the differences between people in different generations were usually enormous compared to differences between individuals in the same generation.

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They were not the first to notice that one generation differs from another, of course. The popular press regularly labels generations with such names a “Generation X,” “Generation Y,” “Baby Boomers,” and so forth, and many articles are published discussing the characteristics of one generation versus another.

For example, the babies born in the 1930s and 1940s were originally called “depression babies,” but in the 1950s, *Time Magazine* gave them a new name: the Silent Generation, because they valued conformity and loyalty above all else, and didn't complain about much.

The members of the Silent Generation were too young to fight in World War II, so they lived in the shadow of the G.I. Generation, their older brothers and sisters who became heroes who actually fought in the war, and are now called by Tom Brokaw and others “the greatest generation of the 20th century.”

Meanwhile, the Silents had to deal with a new generation, the Baby Boomers who were born *after* the war. The Boomers were very sure of themselves, and led the antiwar riots and demonstrations during the 1960s and 1970s, rebelling against their parents in the G.I. Generation. The Silents were sandwiched be-

tween these two warring generations, and served as mediators and compromisers.

Identifying generations and archetypes

Strauss and Howe embarked on a project to read biographies, histories and diaries written throughout American history, passing through colonial times, going back to the original English settlers.

Reading these histories and diaries, they came to a startling conclusion: That generations following historical “fourth turnings” or “crisis wars” follow the same pattern as generations following World War II, and that the sequence of these generations leads to the next crisis war.

The TFT authors identified four distinct generational types that are repeated over and over, and are similar to the generations they had studied.

The four generations are as follows:

- **The Hero Generation.** Like America's G.I. generation, these are the young men and women that fight in a crisis period. After the crisis ends, they become society's powerful civic leaders who build new institutions that promote social order and productive activity. They become hubristic, and in their elder years, they're attacked politically by their children in the Prophet generation.
- **The Artist Generation.** Like America's Silent generation, they grow up as children during the crisis period, come of age as sensitive young adults, and grow old becoming indecisive but empathetic leaders.
- **The Prophet Generation.** Like America's Baby Boomers, they're born after the crisis period, and grow up in the glow of success. In the case of the Boomers, they grew up at a time when America had beaten the Nazis and had beaten the Depression. The Prophets grow up into narcissistic adults who challenge the authority of their parents, the Heroes. In mid-life they become moralistic, and end up as the wise elders leading the society into a new crisis period.
- **The Nomad Generation.** These people grow up in the shadow the Prophets, and don't get along with them very well. They become alienated young adults, with a high incidence of crime and drug abuse, but mellow into pragmatic midlife leaders during a crisis period.

These generational archetypes were found by the authors when they read several centuries of histories and diaries. They were surprised to find that these types cycled.

Generational eras - the four Turnings

Corresponding to the four generational archetypes are four eras or “turnings” through which a society cycles. These are as follows:

- **The First Turning is a High**, an upbeat era of strengthening institutions and weakening individualism, when a new civic order implants and the old values regime decays. This is the era just after a crisis period, when the society is rebuilding, recovering and strengthening itself after the devastation of the crisis. National goals and unity have a higher priority than individual values.
- **The Second Turning is an Awakening**, a passionate era of spiritual upheaval, when the civic order comes under attack from a new values regime. During this period, the hubristic leaders, from the Hero generation that fought (and hopefully won) the last crisis war, are challenged by the spirituality and values of their children, from the Prophet generation.

The authors describe this period as follows: “An Awakening is an era of cultural upheaval and spiritual renewal. It begins when the waxing social discipline of the High suddenly seems tiresome, unfulfilling, illegitimate, and unjust – and when people begin to defy it in the name of spiritual authenticity. By now, memories of the last Crisis are buffered by the High's calm and comfort, and the core High virtues are regarded as outmoded, even unnecessary. The Awakening climaxes just after civilized progress reaches a saecular high tide – and just before that progress is overwhelmed by the liberating passions of reform and protest. The Awakening ends when the new consciousness converts its enemies and the new values regime overwhelms its oppressors.”

- **The Third Turning is an Unraveling**, a downcast era of strengthening individualism and weakening institutions, when the old civic order decays and the new values regime implants. During this period, individual rights become so important that the society or nation has no common purpose or direction. Individual values have a higher priority than national goals and unity.
- **The Fourth Turning is a Crisis**, a decisive era of secular upheaval, when the values regime propels the replacement of the old civic order with a new one. The authors describe how the Crisis era ends: “The Crisis climax is human history's equivalent to nature's raging typhoon, the kind that sucks all surrounding matter into a single swirl of ferocious energy. Anything not lashed down goes flying; anything standing in the way gets flattened. Normally occurring late in the Fourth Turning, the climax gathers energy from an accumulation of unmet needs, unpaid bills, and

unresolved problems. It then spends that energy on an upheaval whose direction and dimension were beyond comprehension during the prior Unraveling era. The climax shakes a society to its roots, transforms its institutions, redirects its purposes, and marks its people (and its generations) for life. The climax can end in triumph, or tragedy, or some combination of both. Whatever the event and whatever the outcome, a society passes through a great gate of history, fundamentally altering the course of civilization."

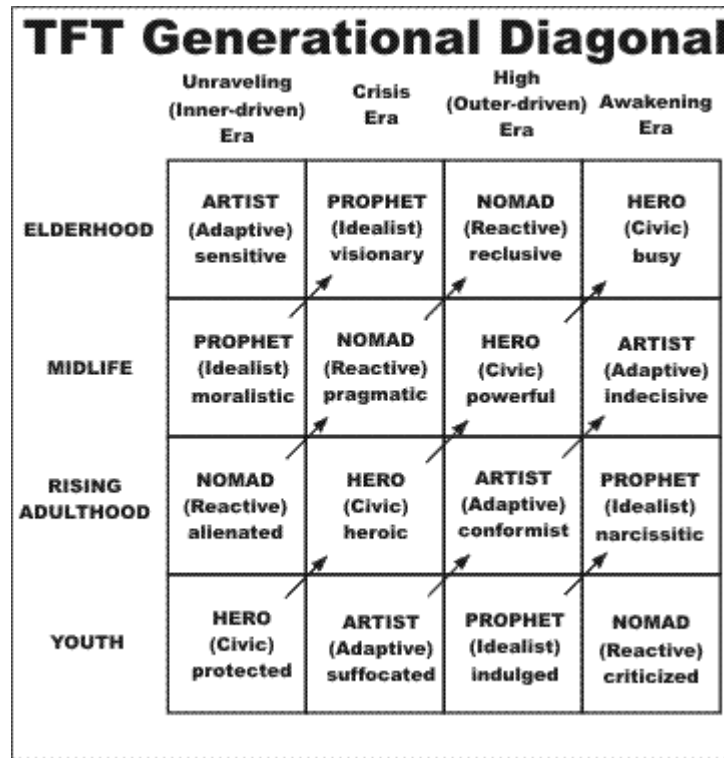
The authors describe the relationships of these eras as follows: "Like the four seasons of nature, the four turnings of history are equally necessary and important. Awakenings and Crises are the saecular solstices, summer and winter, each a solution to a challenge posed by the other. Highs and Unravelings are the saecular equinoxes, spring and autumn, each coursing a path directionally opposed to the other. When a society moves into an Awakening or Crisis, the new mood announces itself as a sudden turn in social direction. An Awakening begins when events trigger a revolution in the culture, a Crisis when events trigger an upheaval in public life. A High or Unraveling announces itself as a sudden consolidation of the new direction. A High begins when society perceives that the basic issues of the prior Crisis have been resolved, leaving a new civic regime firmly in place. An Unraveling begins with the perception that the Awakening has been resolved, leaving a new cultural mindset in place."

TFT's Diagonal Diagram: How one generation flows to next

The Fourth Turning (TFT) defines four generation archetypes and four eras or "turnings." The personality of a person in each generation is determined by the era in which that person is born. (Actually, children born two to five years before the start of an era are considered part of that era.)

Thus, the generations determine the eras, and the eras determine the generations.

The relationships between the generational archetypes and the turnings is summarized by the following diagram:



The Fourth Turning Generational Diagonal

This diagram summarizes the TFT generational model: History proceeds in a continuing flow of generational changes, cycling back to the beginning with a cycle length of 70-90 years, the approximate maximum length of a human life-span.

TFT's Six Anglo-American Crisis Events (Fourth Turnings)

TFT's Diagonal Diagram summarizes a complex model that purports to describe how the world works. Does the world really work that way? The TFT authors say that it does for Anglo-American history dating back to the 1400s.

The book *The Fourth Turning* provides detailed evidence, based on reading hundreds of contemporary diaries and histories, that the TFT model works for that period.

TFT describes each turning in detail, and each generation in detail, and how they conform to the TFT model. This information is provided in detail in their

two books, and here we can do no more than provide the barest summary of the events covered.

The following are the six fourth turning crisis events described by TFT:

- **The War of the Roses (1459-87).** There was a civil war between the ruling houses of Lancaster and York.
- **Armada Crisis (1569-94).** Spain's invasion of England was thwarted.
- **Glorious Revolution (1675-1704).** King Philip's War and Bacon's Rebellion in the colonies began a long crisis period that included England's Glorious Revolution of 1688.
- **American Revolution (1773-94).**
- **Civil War (1860-65).**
- **Great Depression and World War II (1929-46).**

TFT shows how each of these crises leads to the next one. However, the Civil War represents an exception that doesn't satisfy the model, as we'll describe.

TFT's Six Spiritual Awakening Periods (Second Turnings)

Just as important to The Fourth Turning (TFT) model as the fourth turning crises are the second turning spiritual awakenings that occur midway between two crises. The most recent American awakening period was the 1960s, which saw the racial equality movement, the antiwar movement, the women's lib movement and the environmental movement.

TFT describes both a crisis and an awakening period as "a social moment," which is "an era, typically lasting about a decade, when people perceive that historic events are radically altering their social environment." The difference between the two kinds of social moments are that crisis periods secular crisis and awakening periods are episodes of widespread and tumultuous spiritual fervor.

As described in the authors' book *Generations*, several social and religious historians since the 1970s have explored the importance of these episodes.

In his 1978 book, www.amazon.com/exec/obidos/tg/detail/-/0226560929 "*Revivals, Awakenings, and Reform*", William McLoughlin identifies five American "awakenings" that conform to [the author's Anglo-American timeline]. McLoughlin defines awakenings as "periods of culture revitalization that begin in a general crisis of beliefs and values and extend over a period of a generation or so, during which time a profound reorientation in beliefs and values takes place." Building from anthropologist Anthony Wallace's theory of "revitalization movements," McLoughlin describes how, in a modern society, a spiritual awakening can "alter the world view of a whole people or culture." Over the intervening span of six to eleven decades, "times change; the world

changes; people change; and therefore institutions, world views, and cultural systems must change." He also notes that each awakening episode was, in its own time, an update of the "individual, pietistic, perfectionist, millennialist ideology" which "has from time to time been variously defined and explained to meet changing experience and contingencies in our history."

The authors specify six awakenings, corresponding to the six crisis periods identified above, and following the crisis period by several decades. The last five of the six correspond to awakenings specified by the McLoughlin book referenced above.

- **The Reformation Awakening (1517-39).** In Europe, this was universally known as the "Reformation," and is no doubt the best known of all awakenings in western history.
- **The Puritan Awakening (1621-40).** In England, Scotland, and America, this was often called the "Puritan Awakening." It was also known as the era of "Puritan Enthusiasm" or "Revolutionary Puritanism."
- **The Great Awakening (1734-43).** In the American colonies at the time, this was known as "the Great and General Awakening" and referred to ever since as the "Great Awakening."
- **The Transcendental Awakening (1822-37).** This is a loosely dated period in the United States known to most historians (and McLoughlin) as the "Second Great Awakening," also called the era of "Romantic Evangelism" and "Transcendental Idealism."
- **The Missionary Awakening (1886-1903).** This is called the "Third Great Awakening" in the United States by McLoughlin and a few others, also known as the age of "Reform," "Revivalism" and "Labor Radicalism."
- **The Boom Awakening (1967-80).** This is called the "Fourth Great Awakening" by McLoughlin, at times termed the "new transcendentalism," now generally referred to as the recent "Sixties," "Counterculture," or (especially) "Consciousness Revolution."

Those are all the awakening periods covered by the TFT model.

Limitations and restrictions in the TFT model

The TFT model is powerful and fascinating as far as it goes, because it provides insight not only into the history of our country, but also into our own personalities, as it helps us understand how generations affect us all.

However, the TFT model has substantial restrictions. It applies only to the six Anglo-American cycles previously listed. The authors did not believe that the model would work for most societies, although they suggest that other mod-

ern societies should be tested by reading histories, biographies and diaries written by people in those nations.

According to the authors, the TFT generational paradigm is restricted to modern societies where, "as in America, generations are left free to develop and express their own personalities." We'll discuss this more below.

Another problem with the TFT model is that it's very hard to verify. The authors identified generations by reading histories, diaries and biographies, and looked for certain traits of the people in each generation. However, this process inherently has ambiguities and uncertainties. For example, how do we evaluate whether a particular generation is "Civic" or "Idealist"? The ambiguity arises from the fact that some people in any generation will be "civic," and some will be "idealist." The uncertainties arise because there's no way to determine any information of this sort for many periods in history, because of the lack of written records. There's no way to be certain that someone else reading the same written records would arrive at the same conclusions.

The Generational Dynamics (GD) Model

In developing The Fourth Turning (TFT) model, the authors William Strauss and Neil Howe read thousands of histories, diaries, magazines, and anything else available that would provide insight into Anglo-American generational changes, dating back to the 1400s. From this research, they discovered a pattern of a recurring cycle of four distinct types of peer personalities, arriving in the same repeating sequence. They used this to develop the TFT model, and showed that their Anglo-American timeline was true in this model.

When I first read *The Fourth Turning*, shortly after 9/11, it took me a number of readings to understand the complex TFT model, but at the same time I was impressed with its elegance and simplicity. Furthermore, I felt that it was significant for what it could tell us of our own future.

However, the authors themselves pointed out that the TFT had a number of very substantial restrictions, the most important one that they had only tested it against six Anglo-American crisis periods dating back to the 1400s, and that the TFT model actually failed in one of the six cases (no Hero generation was found for the Civil War). Furthermore, including the Great Depression in the World War II crisis period was inconsistent with the handling of the other ones.

For me, with a background in mathematical logic, these were intolerable restrictions. If the TFT model didn't apply to the Civil War, and applied inconsistently in the World War II crisis period, then how could we possibly be certain that it applies to the current time?

Nonetheless, The Fourth Turning model was so compelling that I became increasingly interested in it, and pursued a decision to do my own research to either validate or refute the TFT model.

My feeling was that the TFT model would have to be shown to be valid in all places and all times if it was to be credible. If that standard couldn't be met, it would have to at least be valid in an overwhelming majority of cases throughout history in order to be worthy of any consideration at all.

This resulted in the development of the Generational Dynamics (GD) model, a modified version of the TFT model which is expanded in some ways and simplified in others. I've tested the GD model in hundreds of situations throughout history, and it's been valid in 100% of those cases. This is a truly remarkable result.

The following sections will describe how the GD model differs from the TFT model previously described, and how it overcomes the restrictions in the TFT model.

Changes and Additions to the TFT model

As developed, The Fourth Turning (TFT) model contains a number of fairly substantial restrictions and limitations. In going from the TFT model to the Generational Dynamics (GD) model, a number of changes had to be made. These changes are summarized here:

- **Split up the Anglo-American timeline.** The TFT authors believed that generational changes in America and England occurred in unison. We've found that this assumption is wrong, and that it's necessary to split their Anglo-American timeline into separate English and American timelines. These two timelines are quite different, until they merge in World War II.
- **Puritan Flip.** This is my name for a major divergence between the English and American timelines, and it's the most important correction to the assumptions about commonality of the English and American timelines have to do with the Puritan Awakening, as described in McLoughlin's book. TFT assumes that the Puritan Awakening had a similar effect on England and the colonies, even though this assumption leads to a date discrepancy. However, it turns out that a close reading of McLoughlin's book specifies that the Puritan Awakening has very different characteristics and timing in England and the colonies.
- **The Principle of Localization.** This is a very important theoretical novelty in GD that expands the TFT model from the six cycles in the Anglo-American timeline to be valid for any place or time. This GD principle specifies that the generational cycles apply only to small regions, albeit

regions that have been getting larger over the centuries. The Principle of Localization provides the theoretical basis for splitting the Anglo-American timeline into separate English and American timelines.

- **Merging timelines.** This is an important theoretical adjunct to the Principle of Localization. Generational timelines apply to very small regions, but as the centuries pass, two nearby regions or nations may be on different timelines until they go to war with each other, and then their timelines can merge. It's also possible for merged timelines to diverge again in the next cycle.
- **Using crisis wars as anchors.** The TFT authors explained how the cycles progressed once they got started, but did not feel they understood how they got started. In the GD model, the cycles can be started or restarted at any time from a crisis war. This is an important correction, since it provides the theoretical basis for the claim that the generational paradigm applies to all places at all times.
- **Distinguishing crisis and non-crisis wars.** The TFT model is based on generational "turnings," as determined by studying Anglo-American histories and diaries, and derives fourth turning crisis periods as one of four cyclic periods. The GD model starts from crisis wars, using a set of cycle-independent criteria for determining whether a war is a crisis or non-crisis war. These criteria can then be applied to any war, after which the series of crisis wars can be examined to determine a pattern.
- **Mixed wars.** A war can be a crisis war for one belligerent, and the same war can be a non-crisis war for another belligerent. This is a consequence of the Principle of Localization.
- **Eliminating secular/spiritual distinction for crisis wars and awakenings.** TFT distinguishes between crisis and awakening events by their secular or spiritual nature. This distinction has been completely eliminated in the GD model which describes how a awakening always follows from a crisis war.
- **Redefine and generalize the "awakening" concept.** The crisis and awakening events are distinguished as follows: A crisis war is a clash across a fault line, while an awakening is a conflict across a generation gap.
- **Short and long generational cycles.** The TFT model specifies that cycles consist of four 20 year generations; the exceptions are explained with speculation. The GD model has a little more flexibility, especially to permit rare long unraveling periods.
- **Self-correction of GD diagonal diagram.** The TFT authors appeared to believe that the generational model, as summarized by the TFT diagonal diagram, is fairly fragile, and that it could only rarely apply. The TFT diagonal diagram has been revised to place the crisis period at the be-

ginning, and to show how the generational flow always self-corrects if there's a perturbation like an unexpected crisis invasion. In fact, we can show that if a crisis war occurs, then the generational diagram corrects itself within just two generations.

- **Change to validation methodology.** Once the model is defined, it's not practical to use histories and diaries to validate it; instead, it's evaluated using crisis war specifications.
- **Losing wars - high vs austerity.** The TFT model gives the era following a crisis period the name "High." However, this is not appropriate for a nation that lost a war, especially if the nation was humiliated by the war. The GD model calls this the "Austerity" period.
- **Civil War anomaly.** In reading the diaries and histories of the Civil War period, the authors were unable to identify a Hero generation, creating an anomaly in the validation of the TFT model. This anomaly is resolved by redefining the meaning of the "Hero" generation.

The above are the modifications to the TFT model to arrive at the GD model. The GD model has been found to apply to all places and times throughout history.

The above modifications are explained in more detail in the following sections.

The Generational Dynamics (GD) Model

While The Fourth Turning (TFT) model starts by identifying generational boundaries, the GD model starts by identifying crisis wars.

The GD model begins with a set of detailed criteria that can be applied to any war to determine whether the war is a crisis or non-crisis war. These criteria are "cycle-independent," meaning that the war is evaluated independently of wars that came before it or after it. This circumvents the tendency to "cherry-pick" crisis wars in order to make the cycles come out right.

The crisis war criteria are given in detail in another chapter (where?), on the Crisis War Evaluation Algorithm.

The Principle of Localization

But it's more complicated than that. The TFT theory applies essentially to only one country - the United States. The GD theory had to apply to every country in every time. This required extending the TFT theory in new ways.

The salient observation is that a crisis war is a very “personal” thing. That is, a crisis war in one place doesn't make a crisis war in another place. The TFT authors define the climax of a fourth turning crisis as a “raging typhoon, the kind that sucks all surrounding matter into a single swirl of ferocious energy. Anything not lashed down goes flying; anything standing in the way gets flattened.”

The problem is scope. Just because a “raging typhoon” occurs in one place, that doesn't mean that a raging typhoon is happening elsewhere. Each nation has its own raging typhoons, and it was clear that it was necessary to show that raging typhoons occur at regular intervals *in each country*.

The Vietnam War is an example. This war was highly politicized in the United States, and created a wrenching division among the American people which forced two Presidents' terms to end badly: Lyndon Johnson was kept from running for a second term, and Richard Nixon was forced to resign. This was a non-crisis war for America.

But the war was quite different for the North Vietnamese. The “Tet offensive” of 1968 was an explosive genocidal life-or-death battle that signaled their determination to win. There were no political divisions in North Vietnam. It was a crisis war for them, as was the massive Cambodian civil war of the 1970s.

Another example is the American Revolutionary War. This was a life-or-death crisis war struggle for the colonists, but it was a non-crisis war for the British, who fought indecisively against a backdrop of intense political debate at home, with an antiwar movement that wanted to let the colonies go their way without bloodshed.

Incidentally, there's an interesting question begging to be asked: Does a belligerent fighting a crisis war always win over another belligerent fighting the same war as a non-crisis war? The answer is no. For example, there were three European crisis war invasions of Russia, a mid-cycle war for Russia in each case: Sweden during the War of the Spanish Succession (Great Northern War for Russia), France during the Napoleonic Wars, and Germany during World War II (Great Patriotic War for Russia). In each case, Russia won, as their enemies were swallowed up by the harsh Russian winter.

So a particular war is, in a sense, many different wars, one war for each belligerent fighting in the war.

The Principle of Localization says that each society or nation has its own separate generational timeline along which crisis wars occur.

Therefore, the crisis war criteria that we just described are applied not just to any war, but rather to each belligerent in the war.

Once the wars for a given society or nation have been evaluated, it's possible then to determine whether the crisis wars follow a cycle of approximately 80-years in length. This test can be used to test the validity of Generational Dynamics.

Derivation of Crisis War Criteria

I feel it's important to give credit for this to the TFT authors.

Crisis wars are less important to the TFT model than individual generational changes are. Nonetheless, the book contains numerous informal descriptions of crisis periods scattered throughout.

The book contains lengthy, detailed descriptions of what a crisis period or a fourth turning period was, and how to distinguish between a crisis period war and a non-crisis period war, or mid-cycle war. They developed this material from their studies of histories and diaries of the Anglo-American timeline, based on written descriptions of crisis and non-crisis wars.

Fortunately, of all the things that history gives us, the thing that it gives us most clearly and abundantly is details of wars. Different historical works will describe the development of agriculture or different kinds of governments, or periods of artistic creation, but those descriptions are all limited. The one thing that they all give us is wars.

So I was able to take the TFT theoretical material on crisis and non-crisis wars and use it to develop the crisis war criteria used in Generational Dynamics. The TFT material has been modified slightly and sharpened, but the basic concepts of a crisis war are derived from TFT.

Eventually, the crisis war criteria were transformed into an evaluation algorithm, which is given in another chapter (page 189).

Crisis War Criteria

The crisis war criteria in the Generational Dynamics (GD) model can be applied to any belligerent in any war to determine whether that war is a crisis or non-crisis war.

The following sub-sections contain general descriptions of the criteria. In a separate chapter (where?), the criteria are given with much greater precision.

Criteria indicating crisis war

A crisis war is like a ball rolling downhill, usually over a period 5-10 years long. It may (or may not) need a push to start, and it may be temporary stopped by obstacles on the way down. But eventually it starts gathering an enormous amount of energy, and at some point its momentum becomes so great that it's

unstoppable, until it reaches the bottom of the hill in an explosive climax that forever changes the landscape.

The rolling ball analogy can be used only so far, but it represents something real: A steadily increasing anxiety on the part of the people fighting the war, an increasing hatred of the enemy, an increasing desire for genocidal vengeance, and a willingness to risk everything for total victory.

To understand the emotion behind a crisis war, you have to think about wars where this kind of energy was displayed: Think of the early 1990s Balkans, where the Serbs pursued massive ethnic cleansing (mass murdering the men, mass raping the women) of the Croats and the Bosnians; think of the 1994 Rwanda war, where Hutus murdered and dismembered a million Tutsis in a three month period; think of President Truman's vengeful statement after a nuclear weapon had destroyed a Japanese city; think of the mass murder and mass destruction of an entire region when General Sherman marched his troops through Georgia near the end of the Civil War.

A crisis war may start out small, but it builds in strength and energy until it becomes as unstoppable a force of nature as a raging typhoon.

In another chapter (where?) we quoted at length Leo Tolstoy's discussion, in *War and Peace* of the Battle of Borodino, and in particular the fact that Napoleon could not have stopped the battle: "Had Napoleon then forbidden them to fight the Russians, they would have killed him and have proceeded to fight the Russians because it was inevitable."

This is the essence of a crisis war. A huge mass of people who are willing to kill or be killed. An unstoppable "ball of invasion," in Tolstoy's words.

So to understand a crisis war, we really need to understand people's feelings and intentions. This is something that the TFT authors were able to measure by reading contemporary diaries and histories.

We required a set of criteria that can evaluate a war based on commonly available facts about the war in ordinary history books, and the criteria should be as free of subjectivity as possible.

Unfortunately, there are no simple numeric measures that can be applied. In particular, the number of battle deaths does not seem to be an appropriate measure. World War I (in Western Europe) showed that it's possible to have a static non-crisis war and still have quite a few war deaths. The American Civil War, the worst war in United States history, killed 0.8% of the population. On the other hand, China's Taiping Rebellion civil war killed almost 15% of the population.

So we need to be able to measure the feelings and intentions of large masses of people, but without using simple numeric measures.

Since we can't measure public attitudes during historical wars, we look for "clues" in the historical descriptions of the wars to see if the criteria for a crisis war are met. If the clues are ambiguous, then it's necessary to refer to additional

sources to get more information. In my experience, it's rare that an ambiguous situation remains ambiguous for long. Whether a war is a crisis war becomes abundantly clear very quickly.

Primary criteria indicating a crisis war

There are two primary criteria that identify crisis wars, and several secondary criteria. The secondary criteria do not by themselves necessarily indicate a crisis war, but they often point to way to seeing how the major criteria should be evaluated.

The two primary criteria that identify crisis wars are:

- **Violent, explosive climax.** The clues for this in historical descriptions are huge genocidal massacres, devastation or destruction of a large part of a nation or society, or a "D-Day" type willingness to sacrifice everything to win. A massacre occurring in just one or two battles is not enough to make it a crisis war; it must be violent over a period of at least months, and involve the killing or displacement of large segments of the enemy population, and possibly risking the nation's own population.
- **Large historical consequences.** A crisis war is usually remembered for centuries by a nation or society that fought in it. It almost always ends in imposition of conditions and compromises designed to ensure that no such war will ever happen again. If the war contains atrocities, then the bitterness and hatred gets regurgitated over and over, for centuries to come, in new fault line wars. A war that's quickly forgotten cannot be a crisis war.

Secondary criteria indicating a crisis war

The following are secondary criteria that identify crisis wars:

- **Secret mobilization.** Example: Germany in 1930s. A country that mobilizes for war in secret is usually preparing to strike first in a crisis war. Why? Because secret mobilization requires the cooperation of a great deal of the public, and indicates very broad support for the impending war.
- **Surprise attack on enemy.** Related to the previous point is that a surprise attack on an adversary usually indicates a crisis war.
- **"Spiraling out of control".** Examples: Rwanda, 1994; French Revolution Reign of Terror, 1792. If a war, especially a civil war, seems to spring

from nowhere, it almost always indicates widespread public desire for war and vengeance.

- **Refusal to surrender.** Example: Germany 1944. If a nation continues fighting even when defeat is clearly unavoidable, it's most likely a crisis war.

The secondary criteria alone do not indicate a crisis war. For example, some non-crisis wars are surprise attacks.

Criteria indicating non-crisis war

A non-crisis (mid-cycle) war is like pushing a ball uphill. It has to be constantly pushed, and if you stop pushing, then the ball stops. Depending on the hill, the ball might roll by itself for a little while, but it always comes to a stop without more pushing. Finally, you get tired of pushing, and the war stops.

The main criterion for a non-crisis war are that it doesn't satisfy the major criteria for a crisis war.

The following are secondary criteria that identify non-crisis wars:

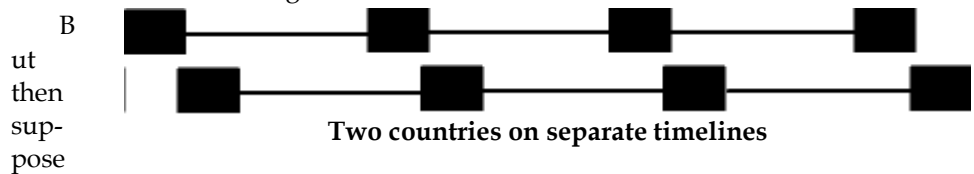
- **Open planning and mobilization.** Examples: America's 1991 Gulf War, England's 1982 Falklands war. If a country openly plans for war and mobilizes, and open states conditions under which war will or will not occur, then the war, if it occurs, is almost always a non-crisis war.
- **Exogenous cause of war.** Example: Germany in WWI. If a country is pulled into a war because of an exogenous factor, such as a treaty with another country or an unexpected invasion, then a non-crisis war is indicated. This situation is a weak indicator since it can also arise in crisis wars, but in the absence of other factors it indicates a non-crisis war. America has similar treaties with many countries today, including Taiwan, South Korea, Japan and Israel.
- **"Top-down war."** Example: Korean War. This refers to situations where a politician leads a country to war with little enthusiasm or support from the people.
- **Strong antiwar (pacifist) movement and political turmoil.** Example: Vietnam War, WW I. This indicates lack of public support for the war.
- **Surprising capitulation or unclear conclusion.** Example: Vietnam war, Korean war. If there's no clear winner to the war, or if a nation capitulates or withdraws before it's necessary to do so, then it's most likely a non-crisis war.
- **Punishment of losers by winners.** Example: Gulf War against Iraq, WW I against Germany. This is a surprising criterion. The overwhelming feeling after a crisis war should be that there's plenty of blame to go

around and to impose conditions to guarantee that another such war won't occur. If punitive conditions are imposed by the victor, then it means that the crisis war has yet to be fought.

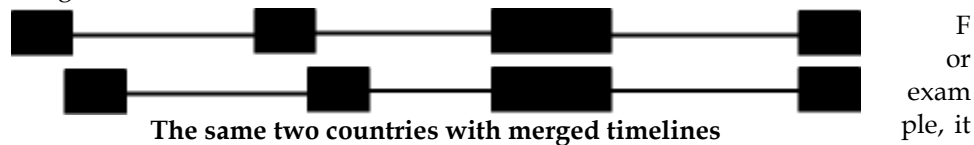
Merging timelines

Another significant theoretical development is the concept of merging timelines.

Imagine two countries having crisis civil wars every 80 years for centuries. Then their timelines might look like this:



that they finally have a major war with each other. Then their timelines can merge, and look like this:



turns out that this is exactly what happened with France and Germany. The countries had separate crisis “religious wars” during the 1500s; the crisis periods partially merged during the Thirty Years War of the 1600s, and then merged completely with the War of the Spanish Succession in the early 1700s.

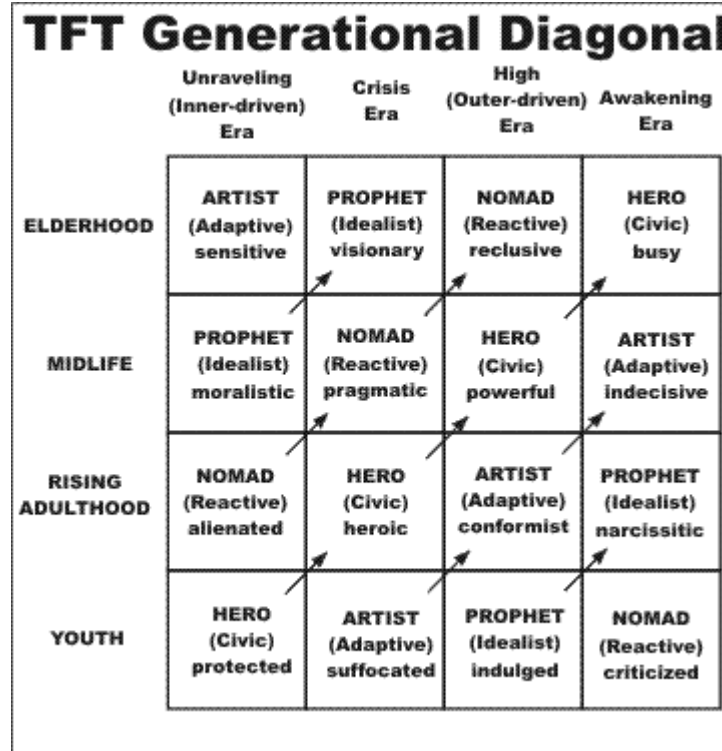
As these examples show, **merging timelines** is a significant feature of the Generational Dynamics theory.

Incidentally, this is only one of many possibilities that occur when two nations on different timelines have crisis wars with each other. In many cases, both countries remain on their separate timelines. This is what happened in the Vietnam War, for example, which was a crisis war for the Vietnamese but a mid-cycle war for America.

Social Moments and Awakenings

The Fourth Turning (TFT) methodology treats crisis events and awakening events in parallel, in the sense that a crisis leads to an awakening and an awakening leads to crisis.

Specifically, the TFT methodology defines a "social moment" as "an era, typically lasting about a decade, when people perceive that historic events are radically altering their social environment." There are two kinds of social moments, secular crises and spiritual awakenings. The authors treat these two kinds of social moments in parallel, as alternating events that arrive out of the exquisite synchronization of generational changes that this diagram portrays:



The Fourth Turning Generational Diagonal

TFT restriction to modern times

In fact, it's this very definition of an awakening that gives rise to the TFT authors' restriction on TFT to modern times.

According to the authors, the TFT generational paradigm is restricted to modern societies where, "as in America, generations are left free to develop and express their own personalities." According to the authors, premodern societies are unlikely to be sufficiently free for spiritual awakenings to occur. Since spiritual awakenings cannot occur, and since awakenings are crucial to the cycle that

brings on the next crisis in the TFT model, the authors conclude that the TFT model cannot apply to premodern times.

This reasoning has always puzzled me. For example, China was very heavily controlled following 1949 when the civil war (between factions led by Mao Zedong and Chiang Kai-shek), and there was very little personal freedom permitted. And yet, the 1989 Tiananmen Square demonstration was clearly an awakening-type event and, after it was brutally suppressed, led to the spiritual group known as the "followers of Falun Gong." It would seem likely that even in heavily controlled societies, the people find a way to express their awakening, even if the leaders aren't pleased. (In fact, we've found that when awakening events are brutally suppressed, the awakening metastasizes into a full-scale crisis rebellion during the next crisis period.)

Problems with the secular/spiritual distinction

The secular/spiritual distinction appears to be appropriate for the Anglo-American timeline covered by the TFT methodology, since colonial and American history include a series of spiritual awakenings — the Puritan Awakening, and the two Great Awakenings of American history. However, once you go beyond those obvious examples, things get very fuzzy.

The secular versus spiritual distinction is not always so obvious. For example, you might argue that World War II was a spiritual awakening, since it was a clash between Jews and Christians in Europe, and that in the end nothing was accomplished, since the concentration camps were taken down.

The fact is that practically every war has some spiritual aspects ("Glory! Glory! Hallelujah! His truth is marching on" in the Civil War), and every awakening has some secular aspects (redefining the FBI and CIA role in the 1970s), and so even within the Anglo-American timeline the distinction between secular and spiritual is vague.

And once you go outside the Anglo-American timeline the problems get even greater. How are we to judge the spread of Islam starting from Mohammed's life? Islam was spread by a series of wars, starting with the conquest of Mecca and continuing throughout the entire Mediterranean conquest. Since Islam was a part of every such war, they could all be called spiritual; and yet, because enemies were conquered, administrative services were set up and taxes were levied, they could all be called secular. The same could be said for the Catholic Crusades as well. And China's Taiping rebellion began as a growing religious sect, and ended up killing tens of millions of people.

So the secular/spiritual distinction may or may not work on the Anglo-American timeline, but it definitely doesn't work throughout history.

GD Awakenings

The Generational Dynamics (GD) theory has a totally different view of awakenings.

According to GD theory, a crisis period can occur at any time, but an awakening period can only occur at a particular time: One generation past the end of a crisis period. In GD theory, a crisis is the *generator* of an awakening.

In GD theory, an awakening does not lead to a crisis; instead a crisis leads to both an awakening *and* the next crisis.

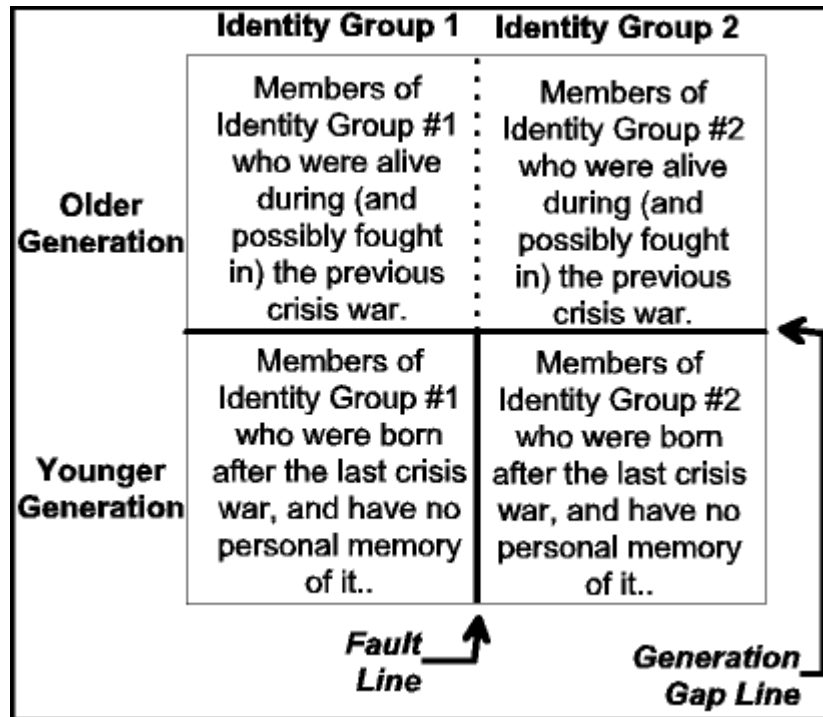
In GD theory, the secular/spiritual distinction is completely abandoned. A crisis era is distinguished from an awakening era by whether it *unifies* society versus whether it *divides* or *polarizes* or *disunites* society.

The reason this can be is by noticing something that the TFT authors also noticed: That all the spiritual awakenings in Anglo-American history were rebellions by the younger generation (the Prophets) against “the establishment,” the older generation (the Heroes). It's this kind of generational conflict that determines an awakening, irrespective of whether there's a spiritual overlay. The TFT authors noticed this as an incidental fact; to GD, it's central.

More specifically:

- **A crisis era** is a social moment in which the people feel that the existence of their entire society is at risk in the short term, or at least that their way of life is at risk, so much so that they put petty generational, gender, political or personal differences aside, and unite for the common purpose of saving their society. Unity occurs with separate identity groups (ethnic, religious or geographical groups), and this is also true within separate groups in a civil war.
- **An awakening era** is a social moment in which the people feel no short range risk for their society or way of life, so much so that political, generational and gender differences are strongly emphasized, with the *intention* of creating political conflict. Disunity particularly occurs within generational lines, caused by a “generation gap” between those who fought the last crisis war and those who were born after the last crisis war.

The difference is illustrated by this diagram:



Fault lines and generation gaps

The above diagram illustrates two identity groups during an awakening period some 20-40 years after fighting a crisis war with each other. The vertical line represents the “fault line” that separates the two identity groups, and the horizontal line represents the “generation gap,” and separates the generations born before and after the war. The conflict is across the fault line during a crisis period, and across the generation gap during an awakening period.

Using Crisis Wars as Anchors

The Generational Dynamics (GD) model adopts a very different view from The Fourth Turning (TFT) model of the generational flow that gives rise to crisis wars and awakenings. This view resolves the restrictions in TFT to the modern Anglo-American timeline.

As I'm writing this, in mid-2004, America is in the midst of a Presidential election, and partisans on both sides are arguing about some of the silliest things, as politicians often do.

Now suppose that things change next year (irrespective of who wins the election). Suppose that there are major terrorist attacks on American soil; that

America suffers a calamitous defeat in a major battle overseas; that financial disaster strikes, throwing many Americans out of work; and that disease begins to spread through the large cities of America. Suppose further that this launches America into a worldwide war, with a universal draft, that the war lasts several years, and leaves much of the world, including America, in ruins, with tens of millions of Americans killed.

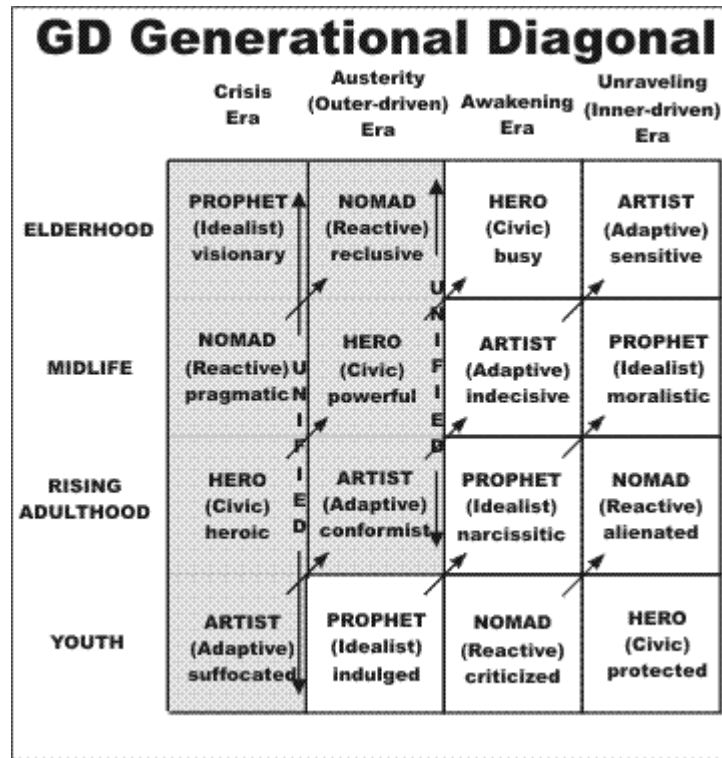
Events like these tend to focus the mind. Suddenly ancient political battles don't really matter much anymore. There'll be plenty of blame to go around – politicians who didn't prepare the country properly, generals who made mistakes, ordinary people who didn't bother to save money or stock up on food.

Once the war is over, the survivors are going to be different people than they were when they started. Generational differences are going to be leveled as everyone in the nation works together just to survive. Once the war is over, everyone will have to continue to cooperate to rebuild the nation.

This example leads us to the following view, in distinction from the TFT theory: In the GD theory, we assume that the crisis war unites the generations so that, generally speaking, all major personality differences are muted or erased.

TFT hints at this anyway. TFT says that a crisis war unites the country behind a common purpose, that children become underprotected (in other words, they're like everyone else), and that gender roles are emphasized (indicating less gender conflict). These all point to the idea that generational differences themselves are muted.

The generation flow diagonal diagram for GD becomes the following:



The Generational Dynamics Diagonal Flow Diagram

In this revised diagram, the “Crisis era” is moved to the left, to emphasize that its the crisis era that launches each cycle. The shaded areas indicate unified groups of generations whose differences are muted.

During the crisis era, all generations work together for a common goal. During the Austerity period, the three older generations continue to do so, but the new Prophet generation sees things differently. Note that TFT calls the elder Nomads “reclusive” and the young Artists “conformist” during the Austerity period, hinting that they go along with the Heroes plans, but with a bit of reluctance.

The Awakening era brings out the full generational conflict, as previously muted generational differences become prominent again. The Artists' reluctant conformity during the Austerity period turns to indecisiveness during the Awakening, with many of them forced to pick sides between the Hero and Prophet political positions.

The last generational transition, from Awakening to Unraveling, is the same in GD and TFT, but here is where timings can change.

TFT sees each of the four eras as equal, roughly 20 years each. GD sees some variations.

The crisis period takes as long as it takes. It might be a three month massacre (Rwanda, 1994) or a lengthy war with merging timelines (Thirty Years War). It might be something else, like the Puritan migration to the colonies. But however long it takes, the climax of the crisis period launches the cycle.

The Austerity period is fixed at about 15-20 years. That's because that's how long it takes for the new post-war Prophets to make themselves heard.

Awakening periods, like Crisis periods, take as long as they take, until the crisis is resolved by some "internal revolution" (Nixon resigns, China crushes the Tiananmen demonstrators).

Most of the variability in cycle lengths is packed into the Unraveling period, with some ambiguity as to when the new crisis period is entered. An unraveling period can be very long (e.g., in the colonies, prior to the Revolutionary War), but its length can't often be measured, since it's unclear when the crisis period begins.

The First Turning – High versus Austerity

The TFT theory designates the first period following a crisis as a "High" period. In America's High period starting in 1945, America's had conquered the Depression and had conquered the Nazis, and believed that they could conquer any enemy.

In all the crisis wars in TFT's Anglo-American timeline, "our" side seems to be the winner, and so the designation of "High" seems to fit.

Defining the "Austerity" period

Developing Generational Dynamics required extending the generational paradigm beyond the Anglo-American timeline, including to societies and nations that lost crisis wars and were humiliated by losing crisis wars. In such situations, the term "High" isn't appropriate.

GD looks at the period following a crisis war quite differently. Irrespective of whether a nation wins or loses, when a crisis war ends, new emotions take over in the public. There's a relief that the country survived, there's acceptance of the victory or defeat and the compromises that were required, there's guilt and controversy at the atrocities committed by them and fury at atrocities committed by others, and most of all there's a determination that no such war must ever happen again.

In a sense, the period following a crisis war is a kind of “high,” even for the losing side, because this is often a period of great prosperity, since there's plenty of land and food for the smaller population that survived the war.

But what always characterizes this period is a willingness to impose austere societal rules to guarantee that the nation will be safe. The nation and its way of life survived, maybe just barely, but there's a determination that no such risk should be taken again. “I don't want my children to have to go through what I went through!” is a common sentiment. There is a willingness to impose austere rules to protect society, and so we use the word “Austerity” to describe this period.

TFT's Civil War anomaly

The TFT authors found a major anomaly in the American civil war, namely that they found no Hero generation.

This can't happen in the GD theory, since we define the Hero generation to be the generation of young soldiers who fight during a crisis war. For GD, every Yank and Rebel who fought in the Civil War was a hero, at least while he was fighting in the war.

I've always been puzzled about why Strauss and Howe never found a Hero generation from the Civil War. After all, didn't they hold parades during the first decade of the 1900s for the “hero” Civil War veterans? I assume that the authors simply didn't find a generation of people who felt like heroes after the Civil War, especially because of the atrocities that their North and the South inflicted on each other, their brothers.

Similar feelings are likely to hold after any crisis civil war, or in any crisis war where the “heroes” ended up losing the war. They may not feel like heroes after the war, but they're still responsible for rebuilding a devastated nation, and devising the austere rules to protect their society from ever experiencing such a crisis war again. Thus continues the generational cycle.

In this sense, there certainly was a “hero generation” in the Civil War, and there's also a “hero generation” in any crisis war, even when they lose the war.

The Nazi “Hero” Generation

Some additional insight into this issue is provided by recent studies conducted by German researcher Harald Welzer, and published in his 2002 book, www.amazon.de/exec/obidos/ASIN/3596155150 "*Opa war kein Nazi*" (“Gramps wasn't a Nazi”).[#]

In interviews of 40 German families, the researchers found that memories of the Holocaust do not exist in family memories. They refer to the Holocaust as "the bad time," but they describe their own family members as either victims or heroes. In two-thirds of the families interviewed, the grandchildren thought their grandparents resisted the Nazis or helped Jews, even though the opposite was true.

These stories make it clear that Nazis who committed war crimes lied to their families after the war, even though these were the same men who rebuilt Germany from the ruins of war.

It's clear that these men were not of the same celebratory mindset that, say, the American and English soldiers were. One might be tempted to think that the generational paradigm doesn't apply in this case, or at least that the timeline might be delayed until the "hero" soldiers of the war had some time to recover from their shame.

And yet, it's clear that nothing of the sort happened, and one way we know this is that the awakening-type events in Germany were clearly parallel to awakening-type events in America. This indicates that the post-war Austerity period in Germany began at the same time as in America, and that the Awakening period also began at the same time.

According to a BBC article summarizing the events of the 1960s, and in particular the riots by the "'68ers":

In the revolutionary late '60s and early 70's, many German universities were in effect taken over by radical students. They held stormy political debates, drew up manifestos against "western imperialism", and planned regular mass demonstrations.
<http://news.bbc.co.uk/1/hi/world/europe/1250944.stm>

This is exactly the time frame when American colleges were being taken over. For example, see on my web site how Mark Rudd took over New York's Columbia University in 1968. <http://www.generationaldynamics.com/cgi-bin/D.PL?d=ww2010.weblog.log0408#e040818>

Another description of Germany in the 1960s says the following:

The next frontier is the tumultuous 1960s, which are usually considered a crucial turning point in postwar history. West German youth rebelled against a culture that many believed had become excessively materialistic; they criticized the politics of West German realignment with the West and looked critically at their own nation's past and present, pointing to the many continuities that persisted from the Nazi era. These included authoritarianism (not least in the institutions of higher education, in the police forces, and in the legal system), xenophobia, technocracy, and patriarchy. Purging society of these legacies became an urgent priority of the West German New Left. <http://hsozkult.geschichte.hu-berlin.de/TERMINE/2001/cdhiw4.htm>

It's clear that the tumult in Germany was fought over similar, though not identical, issues as the issues in the American 1960s, but what also comes through is that the younger generation had a generational conflict with their elders, what we'd call the "hero generation," that had fought in WW II.

The point I'm making is that the generational flow specified by Generational Dynamics works even for the losing side, the humiliated side, in a crisis war. This is significant because it shows how the GD theory applies to all nations and societies. The generational paradigm is buried deep into the human condition, and it doesn't just apply a single Anglo-American timeline.

Self-Correction and Restarting the GD Model

The Fourth Turning (TFT) authors don't explain how the TFT model gets started, but describe it along the Anglo-American timeline as a *fait accompli*, starting in the 1400s, and continuing to the present time. They suggest that the model is fairly fragile and can't be perturbed.

In fact, the generational model that the TFT authors developed is very robust and flexible, and with the changes we've described, it's capable of restarting at any time if it's perturbed.

The previous section shows that the GD model is self-correcting in the sense that if a crisis war occurs, then the model will be correct within two generations - by the time of the Awakening.

Applying GD to Premodern Times

The GD approach removes TFT's restriction to modern times. You can start with any society, region or nation at any point in history and identify a crisis war. The GD Generational Diagonal diagram shows how the generations flow from that point on, leading to new crisis wars.

Short and long generational cycles

The TFT authors assume that saeculae (a saeculum is the period from the end of one crisis period to the end of the next) is always right around 80 years, and that each of the four periods (crisis, high, awakening, unraveling) is 20 years long.

We've found a great deal more variation in the lengths of the generational cycles. We've found that the most useful measurement is the length of time from the end of one crisis war to the beginning of the next. The data in chapter xxx yield the following results:

# years	Fraction of total
-----	-----
0- 40	0%
41- 49	11%
50- 59	33%
60- 69	25%
70- 79	16%
80- 89	4%
90- 99	6%
100-117	5%

From the point of view of determining generational cycles in GD, the fact that there are shorter and longer cycles isn't of crucial importance. However, we believe that by more closely analyzing the reasons for short and long cycles, it would be possible to improve the GD Forecasting Methodology (see chapter xxx). This is a planned future project.

Related to this point, we make the following observations:

- We've never identified a situation where a new crisis war for a region starts less than 40 years after the end of an old one. We're not entirely certain why this never happens, since you would assume that at some time in history somebody got invaded during an austerity or awakening period. This means that no new crisis war has ever begun as long as the previous generation of Heroes was in charge. It would be worthwhile to determine how Heroes prevent another crisis war.
- If a new crisis war begins in the 40-59 year period, then the soldiers are Nomads. In the 60-89 year period, the soldiers are Heroes, while the Nomads implement the vision of the Prophets. For crisis wars after 90 years, the senior leaders are Nomads. We believe that the Nomads have a very important role in leading the nation into the next crisis war, and that their role is much more important than the TFT authors assumed.
- What role do Prophets play in very long periods (80 or more years to the next crisis war)? We believe that the Nomads learn from the vision of the Prophets during the pre-war period, and then carry that vision forward into the next crisis war, even though the Prophets are no longer around.

- We note that some of the world's worst dictators are early Nomads (born 16-25 years after the end of the last crisis war), including Adolf Hitler, Josef Stalin, Leon Trotsky, Osama bin Laden, Abu Musab al-Zarqawi, and Shamil Basayev (the guy who masterminded 2004's Beslan school massacre). This supports the idea that the angry, disaffected Nomad generation is the one that leads the nation into the next crisis war.

All of this requires further research, and we believe that such research will be extremely well rewarded by a much more accurate GD Forecasting Methodology.

Split-up of Anglo-American timeline

There is the one place where the TFT timeline runs into a great deal of trouble, and that's England and America in the 1600s. The TFT authors believed that the behaviors and attitudes of the English and the colonists ran in parallel, and that this justifies treating the England and America from the 1400s to the 1900s on a single Anglo-American timeline.

We found that this belief is not true, as we'll describe below in the section entitled "The Puritan Flip."

However, the basic problem is that the GD Principle of Localization must be honored. Different societies, regions and nations have their own separate, personal timelines. As we've emphasized in several places elsewhere in this book, even when two countries fight in the same crisis war, from their individual perspectives it will usually look like two completely different wars.

By trying to squeeze England and colonial America into a single timeline, the authors had to make some compromises which don't make sense.

Here is the TFT list of crisis periods in the Anglo-American timeline:

- War of the Roses (1459-1487)
- Armada Crisis (1569-1594)
- Glorious Revolution (1675-1704) (In the earlier book, *Generations*, the end of this crisis period is given as 1692.)
- American Revolution (1773-1794)
- Civil War (1860-1865)
- Great Depression and World War II (1929-1946)

The first part of this timeline is English, and works fine; the latter part of the timeline is American, and it also works fine. It's where they intersect in the middle that it runs into trouble.

Here are the individual periods within the 1600s portion of the TFT timeline:

- Crisis: Armada Crisis (1569-1594)
- High: Merrie England (1594-1621)

- Awakening: Puritan Awakening (1621-1649)
- Unraveling: Reaction & Restoration (1649-1675)
- Crisis: Glorious Revolution (1675-1704) (In the earlier book, *Generations*, the end of this crisis period is given as 1692.)

An examination of this list reveals several problems:

- This timeline has the English Civil War (1640s) coming during an awakening period. To put a major violent war into an awakening doesn't make sense, and actually flies in the face of the authors' repeated descriptions of what a crisis period is like. The conflict is easily resolved when the English and colonial timelines are split: The 1640s period *is* an awakening period for the colonists, as we'll see below under "The Puritan Flip," but the 1640s is a *crisis* period for the English, where the English Civil War actually took place.
- The TFT authors' explanation for why the English Civil War was an awakening is because it "didn't change anything," since the King was returned to the throne in 1660. However, there are a couple of inconsistencies with this explanation. The English Civil War actually changed many things, including the elimination of the Star Chamber, along with many of the King's powers. The fact that the King was returned doesn't really mean anything by itself, just as World War II was a crisis war without eliminating the throne. In our discussion of the 1660s timeline below, we'll describe in greater detail how much changed.
- The TFT authors give the Anglo-American crisis period – the Glorious Revolution – as 1675-1704. I have been unable to find any significance (in the colonies) to the 1704 date, and I have no idea why that date was chosen. Furthermore, I don't understand how a crisis period can be 29 years long, since I don't believe that an entire population can maintain a crisis "feeling" for that long. Furthermore, as noted above, the 1704 date was new; the previous book, *Generations*, gave 1692 as the end of this period, and there was no explanation given for that date either.
- The TFT authors describe the Glorious Revolution as a non-war crisis period that "settled everything." There are several problems with this. First, the 1675 date was chosen because of King Philip's War in New England, so the period does include a war. Second, The Glorious Revolution settled nothing, especially between England and Scotland. That relationship was settled in the next crisis war, the War of the Spanish Succession. But obviously the problem here is that the colonial and English timelines have to be separated, as we'll describe below.

These are the problems that arise from the TFT analysis of the 1600s Anglo-American timeline. These problems are all resolved by applying the Principle of Localization and separating the English and American timelines. The following sections describe the results.

The 1600s colonies and the Puritan flip

Intuitively, one would expect the generational timeline for England and its colonies to be very close. In fact, that's the assumption that the TFT authors made in merging the English and American timelines, resulting in a date discrepancy.

According to Neil Howe in a private communication, "I don't think it would be possible to make a large distinction between generations in England and generations in the English colonies in America. In the case of the Puritan Generation, they were literally indistinguishable; they all grew up in the same society and (mostly) came of age in the same society. Even by the end of the 1600s, most colonists regarded themselves as 'English' and saw themselves shaped and driven by the same large events back 'home.'"

This is a very reasonable argument, but surprisingly, a close study of the period reveals that there were remarkable circumstances which caused the timeline periods to reverse in the colonies, which is why I call it the "Puritan flip."

The book that inspired Strauss and Howe to develop the TFT theory was the 1978 book, www.amazon.com/exec/obidos/tg/detail/-/0226560929 "*Revivals, Awakenings, and Reform*" by William McLoughlin. Based on McLoughlin's book, the TFT authors identified 1621-1649 to be the "Puritan awakening," even though this period in England included an extremely violent civil war which was quite obviously a crisis war in a crisis period, not an awakening period.

This is where the date discrepancy occurs. McLoughlin's book clearly indicates that the Puritan awakening began by 1610 and ended some time in the 1620s. Not only can McLoughlin's book not support the 1621-49 dates, in fact the book clearly contradicts them.

A study of McLoughlin's book reveals the solution to the dilemma, and shows that something quite different happened, a kind of "awakening inversion" that flipped the colonial turnings around from what they were in England.

The migration of Englishmen to colonies was not unlike a crisis period in the following sense: Petty political and personal differences had to be put aside, and all generations had to unite in order to survive in the new land. Thus, during the period 1610-30, while the Puritan awakening was going on in England, the Puritans who migrated to the colonies were actually going through a kind of Crisis period, before things settled down into an Austerity period.

During an Austerity period, everyone unites to impose a structure on society to protect it. The kids born during the Austerity period rebel against this structure, and that's what causes the Awakening period. In the case of the colonies, the structure was based on Puritan principles, and when the Awakening era arrived, it was to rebel against Puritanism.

That's how the remarkable "Puritan flip" occurred. The timeline for the colonies was flipped from England's timeline in two different ways:

- The crisis and awakening periods were flipped. Starting from 1610, England went through the Puritan awakening, then an unraveling, then a crisis period with the English Civil War in the 1640s. But the colonies went through a kind of Crisis period, then an Austerity period, then an awakening in the 1640s.
- The attitudes toward Puritanism were flipped. Puritanism was adopted by the kids (Prophets) in the English awakening, but was adopted by the adults (Heroes) in the colonial awakening. In England, the awakening protests *favored* Puritanism, while in the colonies, the protests *opposed* Puritanism.

Once the English and colonial timelines are separated, and this discrepancy is repaired, then the rest of the 1600s fall into place as well.

As I described earlier, the TFT authors give 1675-1704 as an Anglo-American crisis period, and they say that England's Glorious Revolution was a non-war crisis period. For the reasons I stated in an earlier section, this simply doesn't make sense.

But once you separate the English and colonial timelines, everything falls into place. The crisis period in the colonies climaxed with the extremely bloody and violent King Philip's war in New England, and the Glorious Revolution climaxed the awakening period in England.

As we move forward in time, the TFT authors identify the Revolutionary War as a crisis period, but what we've found is that this war was a crisis war for the colonies, but a non-crisis war for England. America and England next fought in the War of 1812. This was a non-crisis war for America, but it was the crisis Napoleonic wars for England.

America's and England's crisis periods didn't coincide again until World War II.

The English 1600s timeline (Turnings schedule)

Just to tie up some loose ends, this section and the next section contain my analysis of the separate English and colonial timelines for the 1600s.

According to the Generational Dynamics "Principle of Localization," England and the colonies each has its own separate timeline. There's no reason to believe that the two timelines coincide until the countries fight in the same crisis war, which did finally happen in World War II.

The methodology for finding these dates is briefly as follows: Crisis periods are determined by the crisis wars; Awakening periods are determined by historical awakening-type events (riots, demonstrations, labor unrest, etc.), with the

period ending with some sort of generational clash that establishes a victory for one side or the other; everything left over is either the Austerity period or the Unraveling period.

From the point of view of Generational Dynamics, the exact dates of the mid-cycle periods are not important. As we've previously said, it's the climax of the crisis war that launches the mid-cycle period that leads to the next crisis war. Thus, these dates are approximate; any of these dates could be off by four or five years.

1560s-88: Armada war crisis period.

1589-1604: Austerity period.

1604-21: Awakening period. Began with ascendancy of James VI to throne, sparking the first widespread opposition to Anglican Church. By 1606, a separatist church had been formed by the Puritans, and they were so harassed that they were forced to flee to Holland. (This was the group of Pilgrims that landed at Plymouth Rock in 1620.) An awakening often ends with a bloodless "internal revolution" (Nixon resignation, Weimar Republic), and this one ended with **The Great Protestation**, "That the liberties, franchises, privileges, and jurisdictions of parliament are the ancient and undoubted birthright and inheritance of the subjects of England, and that the arduous and urgent affairs concerning the king, state, and defense of the realm... are proper subjects and matter of council and debate in parliament." The king crushed the revolt by dissolving Parliament and imprisoning its leaders.

1622-40: Unraveling period. Charles I took over in 1625 amid further confrontations with Parliament. In 1629, Charles began the "Eleven Years' Tyranny," where he ruled as dictator, without Parliament, using the Star Chamber and imprisonment to control the opposition and hold off bankruptcy.

1640-60: Crisis period. Full-scale civil war between King and Parliament, ending in the beheading of Charles. This was a very violent war, ending with the beheading of the king, then ten years of military dictatorship under Oliver Cromwell. Then, when Cromwell died and England sank into anarchy, the desperate Nomads and Heroes pulled together and united behind a compromise: Bring back the son of Charles as King Charles II from his exile in Holland, but with vastly reduced powers. This was a vastly weakened King compared to his father: the Star Chamber was abolished; the King's power of taxation was abolished; the King's power to dissolve Parliament was abolished; forced loans, imprisonment without trial and martial law were also all abolished.

1661-79: Austerity period. The country was still a wreck, with an enormous level of hatred, bitterness and a desire for revenge, especially by the Cavaliers (noblemen) who had lost their land to the Roundheads. This led to the work of Edward Hyde, now Earl of Clarendon, who had been Charles' faithful servant during his long exile in Holland. Clarendon had the job of developing a series of laws to define the relationship between King and Parliament, and to settle their

relationship forever so there wouldn't be another war between them. Following in the footsteps of Abraham Lincoln, Clarendon and Charles were as conciliatory as possible, and steadily refused to permit a general revenge upon the Roundhead party. During this period there was a major political realignment, forming the Whig and Tory parties. Enormous bitterness from the Civil War continued throughout the Austerity period. Although the Star Chamber had been abolished, Clarendon had found other illegal means to imprison enemies and convey them to places outside of England. (Following in the footsteps of President Andrew Johnson, Clarendon was impeached for high treason, and had to flee to France.) Protestors tried repeatedly to pass a bill forbidding illegal imprisonment, but were defeated each time.

1679-89: Awakening period. A new era began with the passage, finally, of a most important landmark in the constitutional history of England: the **Habeas Corpus Act of 1679** which, among other things, required that a prisoner be brought before a court within three days to determine whether the imprisonment is legal. There was great public discontent with Charles' close relationship with King Louis XIV of France. The discontent changed to fury with the unpopular non-crisis war with France against Holland, especially when they learned that Charles had signed a secret agreement with Louis to split Europe between them and make England a Catholic Monarchy. Parliament clamped down on the King's budget, and Holland, led by William of Orange, drove back the French army by opening the dikes and flooding the meadows. The Parliament remained vexed with Charles' continuing closeness to Louis, and things became worse in 1685 when James II ascended to the throne and maintained that closeness. A standing army in England horrified the public anyway because of the Civil War, but James not only built up an army, but also populated it with Catholic officers. The public was further infuriated when Louis revoked the Edict of Nantes, and forced the emigration of hundreds of thousands of Protestants (Huguenots). Many feared a new civil war in England, but we now know from Generational Dynamics that a major civil war during an awakening period is impossible. The crisis was resolved with in 1689 with another bloodless "internal revolution," when the Parliament offered the crown to William and Mary, the latter being James' daughter, married to William. Their ascendancy, together with the **Bill of Rights**, which asserted the "true, ancient, and indubitable rights of the people of this realm," marked the **Glorious Revolution**. (Compare this text to the text of the Great Protestation that ended the last awakening period in 1621.)

1690-1701: Unraveling period. Oliver Cromwell's harsh rule in the 1650s had put Scotland under English control, but in the 1660s there were already the first rumblings of Scottish discontent with the arrangement. Generational Dynamics shows that a crisis war always ends with compromises and settlements that often become unraveled during the following decades, leading to a new crisis war. This appeared to be the case with Scotland. The Glorious Revolution was the kind of unraveling compromise one normally sees: Scotland agreed to

William and Mary as sovereigns; but the agreement made Scotland so independent again that for all practical purposes England and Scotland two separate countries again, and the Scottish Parliament was an independent force. (Ireland also presented serious problems which I won't recount here.) Things came to a head in 1702 when King William died. Queen Anne succeeded, but her last surviving child had died in 1700, so there was no line of succession, and Anne was in ill health. To settle any remaining questions on succession left open by the Glorious Revolution, England passed the **Act of Settlement** in 1701, guaranteeing that the sovereigns of Great Britain were to be Protestant and not leave the kingdom without consent of Parliament, and passing English Succession over to the Protestant House of Hanover. This brought the Scotland crisis to a head, as Scotland refused to accept the Act of Settlement.

1701-14: Crisis period. Suddenly the War of the Spanish Succession broke out - a major war of conquest by Louis of France. England and France had been fighting a non-crisis unraveling war (the War of the League of Augsburg) with France since the Revolution, with indecisive results, but now England was doing poorly, and Louis was allying with Scotland. England's entire empire was in danger and a new civil war would have occurred, when finally England miraculously defeated the French army in the Battle of Blenheim in 1704. Without France's support, Scotland acquiesced to the Act of Settlement and a civil war was averted. Nonetheless, the war in Europe continued because Europe was still in danger from French conquest. The August, 1709, battle of Malplaquet was the climax of the war, and the bloodiest war in Europe for the entire eighteenth century. France and England lost 25,000 and 20,000 men respectively. The war was technically a victory for England, but in fact, it ended England's active participation in the war. The war ended in 1714 with the Treaty at Utrecht, which the statesmen of the time signed because they wanted to avoid for as long as possible another violent conflict such as the one that had just ended. In fact, it defined the national boundaries and kept the peace in Europe until the French Revolution in 1789.

The Colonial 1600s timeline

All of the following dates are fairly indefinite and require more research. These dates might also have to be modified because of events outside of New England. However, the precise specification of these dates is not a crucial issue to the theory presented in this book.

1600-20: Crisis period. Migration of first English settlers, including Puritans to the new world. Not a war, but a crisis period nonetheless because it forced the generations to put aside petty differences to survive in the new world. The crisis

period ended when a peace treaty was signed with Wampanoag Indian chief Massasoit, and they shared Thanksgiving dinner.

1620-30: Austerity period. Migration of English Puritans to New England, establishing a society based on Puritan strictures.

1630-50: Awakening period. The generational protests were against Puritanism.

1650-61: Unraveling period. The colonists and the Indians were really butting up against one another, and the Indians were becoming increasingly anxious that the colonists would drive them off their land. However, the Indians were happy because they were making a lot of money selling furs and skins to Europe.

1661-78: Crisis period. Massasoit died in 1661 and was replaced by his militant son, nicknamed King Philip by the colonists. In addition, a change in fashion in Europe against furs and skins caused a financial crisis among the Indians. Full scale war broke out with King Philip's War in 1675. The war climaxed in 1676, with King Philip's head on a stick, and the crisis period ended with a peace treaty with the Indians in 1678.

1679-90: Austerity period. The War gave the crown an excuse to exert control over New England, and especially to rein in Massachusetts' independence. From 1679-89, the Crown sent a series of officials to the colonies, to reorganize and consolidate the region as a Dominion of New England. However, in 1689, the Glorious Revolution in England led to a Bill of Rights that ensured the traditional powers of Parliament, ended the divine right of kings to govern, and forced James II into exile. The people of Boston rose in revolt and imprisoned the English governor, and restored Charter government. Similar actions took place throughout New England.

1691-1713: Awakening period. A new era began with a new charter for Massachusetts and land to the north. Religious liberty was extended to all except Catholics. In 1692, a group of poor Puritans sought to avenge themselves against wealthier church members by charging witchcraft, resulting in the Salem witch trials. The revolt against England reached a peak in the 1700s decade, when Boston artisans and laborers staged bread riots to prevent the export of grain during Queen Anne's war (the War of the Spanish Succession). The end of the war gives new trading freedoms to the colonies.

1713-63: Unraveling period. Opposition to English rule grew steadily during these years, but the colonists had no choice but to submit, because they needed the protection of the English army against the French and Indians. Protests took many forms, the most interesting being the "Great Awakening of the 1730s-40s," which promoted spiritual opposition to the Anglican Church. (It may seem strange to call this an unraveling thing, but it makes sense when you compare it to the rise of the followers of the Falun Gong after Tiananmen Square.) The period ended with a peace treaty between England and France.

1763-83: Crisis period. Revolutionary war. This was a crisis war for the colonies, but an unraveling war for the English. The favor was returned with the War of 1812 which was a crisis war for England, but a non-crisis war for America.

Note the exceptionally lengthy unraveling period, 1713-1763. This has been a matter of considerable debate among Fourth Turning aficionados.

As we've previously described, mid-cycle periods can be as short as 42 years or as long as 110 years. In this case, King Philip's war ended in 1678 and the Revolutionary War began in 1775. This doesn't present any problem to the major findings of Generational Dynamics, but it is desirable to develop a hypothesis for the breakdown of the intermediate periods.

Based on my research, it seems to me that the Awakening period always begins 15-20 years after the end of the crisis period, and lasts 10-20 years. So if a mid-cycle period lasts more than 60 years, then the Unraveling period has to be longer than 20 years.

I believe that further research will show that long mid-cycle periods are caused by especially difficult non-crisis wars, including crisis wars in nearby regions, in this case the French and Indian wars. Although the Prophet generation disappears during a long mid-cycle period, I believe that they serve the same purpose *in absentia*: their visions will have been transferred to the Nomad generation through education. When the next crisis war finally comes, the Nomads (and early members of the next Hero generation) choose from the legacy Prophet visions in pursuing the next crisis war.

Problems for review and research

- Strauss and Howe use an entirely different methodology than I do. They reached their conclusions by reading histories and diaries, and I reached mine by using crisis wars as anchors. Read the histories and diaries of some other country besides the Anglo-American timeline that they study, and show whether or not those histories and diaries produce the same results as my methodology.
- Strauss and Howe found no "hero generation" in the American civil war. My methodology defines the hero generation as the generation of youth that fight in a crisis war, so every crisis war has a hero generation by definition. Analyze their research and find a way to modify either their definition of hero generation or mine in order to reconcile the different findings.

Appendix: Cassandra

Generational Dynamics gives you a great deal of information about the future. But is the ability to predict the future a blessing or a curse?



Max Klinger 1857-1920: *Kassandra*. Photo ©Maicar Förlag-GML

Cassandra

This is the problem that Cassandra of Troy had.

Now, Cassandra was an extremely beautiful young woman, and was the daughter of King Priam, the ruler of Troy. Apollo was the most handsome of the young gods, and fell passionately in love with Cassandra.

Wishing to gain Cassandra's love, Apollo offered to give her a gift in return for her love. Cassandra agreed, and Apollo gave her the gift of being able to prophesy the future. But once Cassandra received the gift, she broke her word to Apollo and refused him. An angry Apollo could not take back the gift he had given, so he cursed her instead. From that day forth, she would be able to prophesy the future, but she would be unable to persuade anyone of the accuracy of her predictions.

Now Helen of Troy was also overwhelmingly beautiful, and was abducted. Cassandra's brother Paris decided to sail to Sparta to retrieve Helen and bring her back to Troy. Foreseeing the future, Cassandra said, "Where are you going? You will bring conflagration back with you. How great the flames are that you are seeking over these waters, you do not know." [Cassandra to Paris. Ovid, *Heroides* 16,120]

Helen's face launched a thousand ships, as Paris's abduction of her triggered a Greek war against Troy. However, the city of Troy was well defended by a high wall, and after a few years of fighting, the fighting was stalemated.

The Greeks built a wooden horse with a hollow interior, and filled it with soldiers. The Greeks then sailed their ships away, leaving the Trojan Horse behind on the beach.

Seeing the Greeks leave, the Trojans were elated by their victory, and wanted to bring the wooden horse into the city for the celebration.



The Trojan Horse in the Brad Pitt movie *Troy*.

Cassandra warned everyone that the horse was filled with soldiers, but no one believed her, and the people brought the horse into the city.

With the Trojan Horse inside the city, the Greek ships returned to Troy's shores. The soldiers came out of the horse, opened the gates, and the Greek soldiers destroyed the Trojans and the city of Troy.

Problems for review and research

- Why is this story in this book?
- Suppose you were President of the United States, fully understanding Generational Dynamics and its predictions. What would you do? Would people believe you? Would anything you do make a difference?

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End Notes

Note: In some cases, a page reference actually refers to the bottom of the preceding page or the top of the next page.

<Endnotes>

<i>Page</i>	<i>Note</i>
39	<i>"Today, there are about 250 nations, comprising about 9 major civilizations": Samuel P. Huntington, <i>The Clash of Civilizations and the Remaking of World Order</i>, Touchstone, 1996, p.26-27</i>
53	<i>"Population of China in millions of people (graphic)": Peter Turchin, op. cit., p. 169</i>
55	<i>"The Green Revolution began in 1944": Wikipedia, <i>Green Revolution</i>, http://en.wikipedia.org/wiki/Green_revolution</i>
58	<i>"The following graph shows the patterns of war deaths": Michael A Alexander Ph.D., <i>The Kondratiev Cycle: A Generational Interpretation</i>, Writers Club Press, 2002, p. 144</i>
58	<i>"for the last few centuries [test]": Michael A Alexander Ph.D., <i>The Kondratiev Cycle: A Generational Interpretation</i>, Writers Club Press, 2002, p. 144 - test</i>
64	<i>"The adjoining graph, from a recent United Nations report": Jeffrey D. Sachs, Director, UN Millennium Project. 2005. <i>Investing in Development: A Practical Plan to Achieve the Millennium Development Goals</i>. New York, 2005, p.67</i>
73	<i>"This diagram shows how numerous different technologies for artificial light have always been invented at almost exactly the right time (graphic)": Joseph Paul Martino, <i>Technological Forecasting for Decision Making</i>, American Elsevier Pub. Co., 1975</i>
131	<i>"[A] large number of other international relations theories": George Modelski, William R. Thompson, Charles W. Kegley (Editor), Donald J. Puchala (Editor), <i>Leading Sectors and World Powers: The Coevolution of Global Economics and Politics</i>, 1996, pp. 49-50</i>
131	<i>"The following graph correlating war deaths to K-cycles": Michael A Alexander Ph.D., <i>The Kondratiev Cycle: A Generational Interpretation</i>, Writers Club Press, 2002, p. 144</i>
132	<i>"Capital investment cycles.": Joshua S. Goldstein, <i>Long Cycles: Prosperity and War in the Modern Age</i> Yale Univ Press, 1988, p. 24</i>
147	<i>"Find the prime factors of the number 79439": $79439 = 113 * 37 * 19$</i>
150	<i>"described by author Amir D. Aczel.": Amir D. Aczel, <i>Fermat's Last Theorem: Unlocking the Secret of an Ancient Mathematical Problem</i>, Delta, 1997, pp.</i>

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129-133	

Concept Index

The following pages contain a *Concept Index*. For example, one entry is “Bankruptcy triggers French Revolution of 1789.” This phrase is indexed under all of the words it contains, and so you find it by looking up any of these words in the concept. So if you're looking for information about some concept, you can find that information if you can think of just one word in the concept.

<p>ARTIFICIAL Paul Martino, artificial light technologies 73 (278)</p> <p>CRISIS crisis wars and genocide 31 crisis wars and sex 32 frequency of crisis wars 32</p> <p>DRESDEN firebomb/;ing dresden and tokyo 31</p> <p>DYNAMICS Peter Turchin, <i>Historical Dynamics</i> 53 (278)</p> <p>FIREBOMBING firebomb/;ing dresden and tokyo 31</p> <p>FREQUENCY frequency of crisis wars 32</p>	<p>GENOCIDE crisis wars and genocide 31</p> <p>GROWTH Growth trends 72</p> <p>HISTORICAL Peter Turchin, <i>Historical Dynamics</i> 53 (278)</p> <p>LIGHT Paul Martino, artificial light technologies 73 (278)</p> <p>MARTINO Paul Martino, artificial light technologies 73 (278)</p> <p>PAUL Paul Martino, artificial light technologies 73 (278)</p> <p>PETER Peter Turchin, <i>Historical Dynamics</i> 53 (278)</p>	<p>SEX crisis wars and sex 32</p> <p>TECHNOLOGY Paul Martino, artificial light technologies 73 (278)</p> <p>TOKYO firebomb/;ing dresden and tokyo 31</p> <p>TREND Growth trends 72</p> <p>TURCHIN Peter Turchin, <i>Historical Dynamics</i> 53 (278)</p> <p>WAR crisis wars and genocide 31 crisis wars and sex 32 frequency of crisis wars 32</p>
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Colophon

This book was created from standard ascii text files. A collection of software utility programs, written in Perl scripts and Microsoft Word macros, were developed. Using these programs, the text files could be transformed into either an online book (in HTML) or a Microsoft Word document.

The programs supported all the special features of the book, including cross-references, end notes, and the concept index. To support these features, the software generated URL hyperlinks for the online version and page number cross reference fields for the Microsoft Word version.

I believe that these features add a great deal of richness to a book, especially a technical book or any book as complex as this one is.

The web site for this book will be found at:

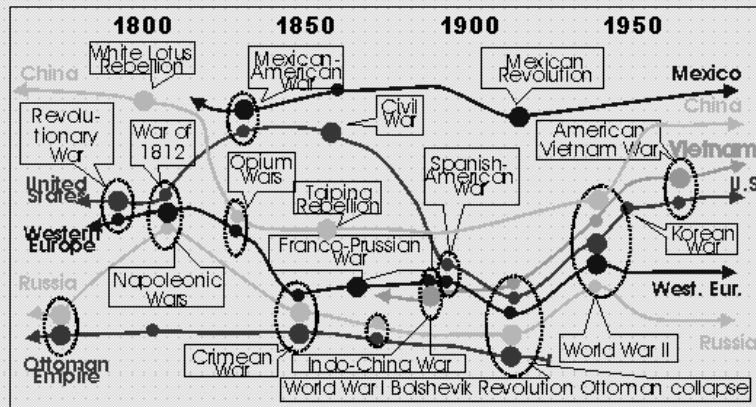
<#stdurl <http://www.generationaldynamics.com/#>>

John J. Xenakis

Book Cover

Art work

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author of *Generational Dynamics*
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Generational Dynamics for Historians

Front cover words

Generational Dynamics
for Historians
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author of *Generational Dynamics ... Forecasting America's Destiny*

Back cover words

Description

<center>**Generational Dynamics for Historians**</center>

Biography



John J. Xenakis is a journalist, writer, technologist, researcher and analyst who became interested in study and analysis of world history and how generational changes over the centuries have led nations into everything from humiliation to greatness. The result is *Generational Dynamics*, a technique for analyzing history and for understanding how nations change their beliefs and attitudes as generations change.