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OUTLINE:

# A Quasi-Completeness Test for Analysis of the Rise and Fall of Civilizations

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## Summary

The collapse of Russian Communism after 75 years sends a shock wave through the countries of Planet Earth. We are accustomed to human civilizations lasting for 300 to 1000 years. Hitler's Nazi Germany that was planned to last 1000 years, only lasted 15 years, but extracted a terrible cost to humanity during those 15 years. If we count the start of US Civilization as starting in 1776, our civilization has lasted 219 years so far. Are we in a time of troubles that normally precedes the collapse of a civilization?

The historian Arnold Toynbee in 1946 published a series of volumes on the rise and fall of some 21 civilizations during the last 5000 years. His studies are a warning to us to carefully examine what is happening to our civilization. The expanding illegal drug usage and the rapidly increasing prison population are preliminary indicators of growing disorganization in our civilization.

In 1940 the scientists and engineers of the USA responded to the challenge of Nazi Germany by organizing projects to develop the weapons that could stop the Nazi's. I was at the MIT Radiation Laboratory working on developing more precise RADAR (microwave) to stop the Nazi fighter planes, bomber attacks, and V-1 rocket bombs over England. Our top scientists temporarily changed roles from research scientists to high level engineers for the duration of the war. A "zeitgeist" or spirit of working for a higher cause developed among the engineers and scientists.

At the MIT Radiation Laboratory, we used a completeness theorem from mathematics to verify that the mathematical series used in our analyses could completely describe the electromagnetic waves in our microwave circuits. A sample case of a completeness test is given for a simple waveform. When we examine the problem of a whole civilization, find that physical, chemical, biological, and sociological phenomena are interconnected and that it is impossible to apply a mathematical completeness test. We find that a simple completeness test is impossible.

In this paper we examine what is the next best thing to a completeness test. I call it a "quasi-completeness test" to organize information on three levels to make an estimation of how well we are covering the needed information from many levels of science and engineering. One, Two, and Three Dimensional quasi-completeness theorems are developed.

The one dimensional theorem consists of stating that three levels of consciousness must be cultivated to insure completeness of coverage of the problems:

(1) individual consciousness,
(2) social consciousness, and
(3) geophysical consciousness.

For most of the last 5,000 years, only the first two levels were necessary. The third level or geophysical consciousness, became necessary for our correct understanding, when we discovered the nature of the Earth's glacial cycles in 1957 by analyzing ocean bottom core drillings.

We have had 23 glacial cycles since 2.4 million years ago, averaging 10,000 to 12,000 years of warmth, followed by 75,000 to 120,000 years of glaciation covering the face of the earth. Scientist are not able to predict whether the present interglacial warm period will end at 10,800 years (1997), 11,000 years (2197), or closer to 12,000 years (3197). Evaluation of other factors by engineers indicate the glaciation could have already started or would start by the year 2005.

Most scientific research in this area is directed only to the question of whether it is getting warmer or colder. We have to have a more comprehensive view of

what the problem is, since some theories include the possibility of the Earth getting warmer just before getting colder and slipping into glaciation. Words are not adequate. We need to have phase diagrams of the glaciation cycle in order to relate observed data with the theory. We may never be able to prove what is going to happen. The most we can expect from theory is to be able to calculate probabilities of competing theories being valid. From these probabilities, we could compute the "Regret Matrices" of alternative action plans.

The Hamaker Thesis
appears to be the most likely candidate for understanding the glacial cycles. From the Hamaker Thesis we can separate out a Hamaker plan of Emergency Action involving: (1) worldwide reforestation, (2) remineralizing the earth to restore soil nutrition, and (3) replacement of fossil fuel burning with alternative energy sources.

Since the program of the American
Republican Party in Congress in 1995 is to make it more and more difficult for the United States to do anything to save or restore the ecology, we have to invent a new form of socialism to save out civilization from collapsing. If we want our grandchildren to have a fair chance of surviving, we must develop a variation of what Dr. Enrique Leff of Mexico City calls "Ecological Socialism" or "Eco-Socialism." He presented his ideas at the University of Havana in November 1994 when I was visiting Cuba.

My variation
of the idea is called "C-SITE-MARKET-SOCIALISM," in which the overall plan for national development is organized by the socialist party and the appropriate government agencies. Then as many sectors of the economy that pass certain tests are allocated to the free market. The tests would be similar to environmental and ecological impact studies, so that industries having a satisfactory environmental impact report could operate relatively free of direct government regulation. The government planning would be similar to the "indicative planning" developed in France under De Gaule. Other sectors of the economy would have to be either public utilities or state-run industries. The "C" stands

for "Cybernetic", "SITE" for Systems Information Theoretical Ecological." The government planning would be directed to finding a path to change the glacial cycle, so the Earth would not have to go through the almost total collapse of civilization in the process of restoring the soil nutrition.

Artificial rock
grinding would be substituted for the grinding of rocks by the glaciers. A simulation of oil prices by Prof. Watt of Davis indicates a sharp rise in the price of oil in the year 2007 to $7,000 per barrel. I don't think that we can make that precise a prediction based only on the history of economic price variations. We need to develop a simulation based on the underlying geophysical processes. To evolve into the future, we need various diverse groups that all have their unique contributions to evolving to the future.

We need the Hindu
understanding of past cycles of civilizations, including the role of the Self Realization Fellowship in passing on such important information; the role of the International Society for the Systems Sciences in organizing our knowledge of systems theory; the role of the enthusiasts for the "Celestine Prophecy"; the work of the Evolutionaries of Barbara Marx Hubbard; the work of the Committees of Correspondence in their search for the Future; and the work of the NewCiv Network of Ventura, California.

The next geophysical crisis after the glacial cycle may be an encounter with an asteroid in about 2,400 a.d.. Most speculations about dealing with preventing a collision involve trying to change the path of the asteroid with a volley of hydrogen bombs. Amore efficient way to avoid a collision would be to develop a "trim tab" method of using the energy carrying etheric waves to add some spin to the earth's orbit so that we would narrowly miss the asteroid. The late Otto Muck (engineer and designer of the snorkel submarine breathing device) of Germany believed that the continent of Atlantis was broken up by a glancing blow from an asteroid about 10,000 years ago.

1. Toynbee's analysis of 21 civilizations' rise and fall.

    Chart: Rise and fall of civilizations. (Toynbee, 1946)

2. Are there any natural processes that need to be added to Toynbee's list?

    Yes: The Earth's glacial cycles, discovered in 1957. (Changed our concept of glaciation from four ice ages to 23 ice-age cycles in on ice-epoch)

(Emilliani, from analysis of core's of ocean bottom sediments.)

3. How do we know, if our civilization is an endangered species?

We need a completeness theorem to determine whether our analyses are adequate.

3A: We need a one-dimensional completeness test for the first approximation:

One: Individual Consciousness

Two: Social Consciousness

Three: Geophysical Consciousness

3B: We then need a two-dimensional completeness test to include intensity, impact, and time to go critical for the major problems:
For this we use a two-dimensional chart developed by John Platt of the Mental Health Research Institute of University of Michigan:

Chart: Intensity of problem (multiplied by)
Number people affected
vs.
Time to go critical (Platt, 1969)
Sample chart for 1964 or 1969 from paper by John Platt:

1995 Version of Chart:

4. Does NATURE have any system for changing the Earth System "Thermostat" Controls, when the survival of life on Earth is threatened?

Yes: The Gaia Hypothesis (Lovelock and Marguiles, 1979)

5. Has anyone attempted to correlate the major problems of the survival of civilization?

Yes: An engineer, John Hamaker, published an analysis, that makes a first approximation to correlating the major problems:
The Survival of Civilization - Three Problems Threatening Our Existence: Carbon Dioxide (& Soil Nutrition), Investment Money, and Population. (1982) Burlingame, California, PO Box 1961. (Primary recommendations: Remineralize the soil, reforest the earth, and stop burning fossil fuels [use alternative energy sources])

6. Have we made any scientific discoveries or interpretations that change the priorities of the problems?

Chart: Planet Earth Temperature Cycles, and Hierarchy of Sub-Sub Cycles.
(Ice Ages, Time-Life Books, 1983)
vs.
Time (4 billion years of Earth time)

7. Have we discovered any secondary functions of the glacial cycles that are important to the future of human civilization?

Yes: A microbiologist, William H. Calvin, has published a book on his hypotheses: The Ascent of Mind: Ice Age Climates and the Evolution of Intelligence. NY: Bantam Books (1991). Dr. Calvin explains his hypothesis on how the human brain grew larger with the cycling of glaciation on our planet.

8. What is the most probable choice for humankind to make in

regard to glacial cycles?

Although the Hamaker Thesis does not accurately predict the temperature trends, neither does any other theory. I conclude that the Hamaker Thesis is the best first approximation we have for dealing with glacial cycle induced climate changes. We also have to deal with man-made climate changes such as the rising carbon dioxide level in the atmosphere from our automobiles and industrial burning of fossil fuels and our destruction of the Earth's forest cover.

9. IN SUMMARY: REMINERALIZE THE SOIL,
REFOREST THE EARTH.
REPLACE BURNING OF FOSSIL FUELS WITH
ALTERNATIVE ENERGY SOURCES.

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