

Scalar Theory of Everything model for steering humanity's growth

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Abstract

We are at a critical time in the evolution of our understanding of the physics of the universe and the evolution of the growth of humanity. Humans lack sufficient knowledge to predict outcomes of their actions. The long-term growth of science and humanity has been by trial-and-error. Life observations are applied to determine new science principles. The process and practice of science and the Scalar Theory of Everything model are applied to suggest how humanity can grow. New fundamental principles of science are proposed. The human species is at such a level that it must reorganize the national and international structure to allow competition and change. Inhibiting change is not an option. Nature's law is grow or die. The measure of success in nature is survival. The national military authority must obey and enforce nature's laws. Competition must be allowed between religions, between approaches to technology, between approaches to society, and between approaches to the environment. Humanity should steer the future by creating a true nation organization. The best state that humanity can achieve is to be able to adapt to changes without the destruction of war or of national collapse.

1 Introduction: the problem

Science and religion cover a large range of knowledge. Some principles become popular and direct human actions. Different groups develop different fundamental principles. Wars between these groups and collapse of groups decide nature's judgment of the principles. Humanity's growth requires nature's

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judgment to be obeyed without war and total collapse. Progress in both of these spheres of knowledge is required.

Cosmology models and elementary particle models are fundamentally inconsistent. Science and the philosophy of life have also been considered divergent. Technology advances during the last 50 years have allowed surprising discoveries. These observations indicate that the “standard” models of cosmology and particle physics are likely incomplete. We are ready for the next evolutionary step in understanding the universe. This future model has already been named the “Theory of Everything”.

The term “Theory of Everything” is meant to include only the physics of cosmology and of particle physics. Life and our social organization are also part of our universe. The principles that apply to physics should also apply to humanity, our social organization, and philosophy.

The Scalar Theory of Everything (STOE) is a self-consistent model that was derived from considerations of galaxies and galaxy clusters. The STOE explains many mysterious phenomena from diverse observational disciplines. The STOE is simpler and more encompassing than other models. An important part of the STOE is to show correspondence to general relativity and quantum mechanics (Hodge, 2013). Correspondence allows the successes of current models to be incorporated into the STOE while explaining problem observations.

Each revolution in physics such as Aristotle’s physics, Newtonian mechanics, electromagnetism, and nuclear forces has produced unanticipated and far-reaching social consequences. Societies grow larger and nations grow more powerful. Little wonder that people outside the physics community are becoming increasingly curious about the universe and increasingly sophisticated.

The evolution and selection of scientific models in current practice is based on the predictions the models make (Curd & Cover, eds., 1998, chapter 4). Deduction forms the model; induction forms the predictions; and testing rejects or, at least, limits the applicability of models. The ability to select and predict then forms the usefulness of technology. Technology drives economic and military power.

The fundamental conditions prior to a major paradigm shift in a science model are:

- (1) Rapid, small, ad hoc modifications are made to the model as new observations are discovered such as dark matter and dark energy.
- (2) Data are interpreted according to the paradigm with marginal results.
- (3) Predictions made by the model fail. Therefore, actions have poor or counter productive results.
- (4) Some paradigms are so entrenched that they are barely recognized as a postulate such as the galaxy redshift is called the “Doppler shift”.

(5) Great social pressure exists to reason from accepted postulates such as ignoring the periodicities and cosmological connection of the pioneer anomaly. This creates a selection bias that is often not recognized. Perhaps this is the reason social outsiders often find the new models.

(6) Observations inconsistent with the popular model are often marginalized or ignored. A very open and tolerant society is required to overcome this bias.

(7) Several “coincidences” have been noticed but there is no understanding about the fundamental similarity such as the similarity of the Pound-Rebka experiment, pioneer anomaly, and galaxy redshift (Hodge, 2006b, 2013).

The image of fallen civilizations is disturbing. The United States and other large nations are too big and powerful for their current organization structure to manage. If great and powerful empires and religions can disintegrate and be grown over with forest, our civilization can collapse. The collapse can be destruction or disintegration as the Roman Empire and the USSR experienced. Indeed, collapse appears to be the rule and not the exception (Tainter, 1990). Archeology has shown collapsed civilizations are accompanied with large-scale death of their citizens. However, biological life continues to evolve and to survive. Humanity must learn to manage larger societies.

Many indications of collapse in the U. S. are found in Tainter (1990). Among these are:

(1) The number and severity of management crises at the Federal level has increased which indicates very poor management.

(2) Since 1970, class conflict is increasing as measured by the ratio of the income of the top 90th percentile versus the income of the bottom 10th percentile. Because the “rich” are fewer in number and number is very important in determining the national government, the Federal government adopts a tax-the-successful-people policy.

(3) The Federal investment in coercion (IRS, FBI, DEA, homeland security, etc.) is increasing.

(4) Successful people and their money are leaving the tax structure of the U. S.

(5) The accompanying jobs are flowing overseas.

(6) Secession movements in several states are gaining strength.

(7) Both mandated costs and direct taxes are increasing without a corresponding return [called “declining marginal returns” by Tainter (1990)].

(8) Undeclared, overseas wars are being fought without a way to repay the costs [called “unproductive war” by Morris (2014)].

(9) The requirements for security during war are forcing restrictions in openness and freedom that reduces tolerance and that benefits those in power.

(10) The Federal government’s ability to solve problems is rapidly declining.
and

(11) Great social pressure exists to reason from accepted postulates such as

“a big government is better” and such as interference in another’s affairs is acceptable.

Collapsed societies have one thing in common; the citizen’s individual survival outlook is reduced. Therefore, the larger political society serves no purpose. The society reduces to smaller political units that can serve only a smaller, less complex society. For example, the availability of food partially depends on the climate. Forecasting climate is a very complex task. If the climate changes to long-term drought, the food availability may no longer sustain the population. Such a strain frequently does cause collapse (Diamond, 2011).

Many of the characteristics of collapse of modern society have been present for several decades (Tainter, 1990, pp. 209-216). However, the collapse is a failure of the society’s organization to adapt to nature and to the changing conditions. Diamond (2011) compared several isolated societies that sustained for millennia with societies that collapsed.

The good news for humanity is that a political society may adjust rather than collapse. Examples of adjustment in addition to those Tainter (1990) suggested are:

- (1) Change to more technology such as the development of fertilizer around 1800 and such as development of new food sources as was done in northern Europe with the potato. This requires a tolerant society. A highly regulated society will fail.
- (2) Compete to conquer neighbor’s food. A society that has lost its military resolve and strength will fail.
- (3) Change by moving to more fertile areas such as the Sami peoples’ semi-nomadic reindeer herding.
- (4) Adjust the population to a level that the food supply can support. This is nature’s solution. The attempt to save a few weak individuals results in a greater number starving. This is how predators help prey species survive.

The current difficulty is that the complexity of our society is too great for our limited understanding of the workings of complex societies (Williamson, 2013, pp. 19-32)(Tainter, 1990). The results of federally funded social programs are often opposite to the stated intention. For example, federal spending in education is increasing while the U. S. is suffering a “dumbing down” relative to other countries(Gatto, 2002). Each social issue the Federal government assumes is dealt with in the most expensive manner and in a trial-and-error manner. The difference between the states on such issues is causing the U. S. to behave similar to the pre-civil war era. Competition among the states to determine the best policy on any one issue is ignored. The states seek Federal laws to control the actions of other states such as mandating the return of slaves from northern states. Therefore, only one approach is tried at a time.

The difficulty caused by complexity is compounded by marginalizing knowledge that has successfully predicted events, but is politically awkward. For example, Friedman (1962, 1980) predicted stagflation that Keynesian derived doctrine said could not happen, predicted the collapse of the soviet system that Keynesian derived doctrine praised, and predicted negative results of big government (wikipedia, March 2014). The Keynesian derived doctrine of big government has repeatedly been falsified. Friedman argued for a small national government, which the politicians vote against.

The ability to predict observations and results of actions reduces the time and expense of solving problems. Increasing knowledge increases predictability of ever more complex problems. Trial-and-error is a problem solving method for problems more complex than existing knowledge can predict. Increasing the number of trials decreases the time and expense needed to solve problems.

People and societies differ in many basic ways. Each has developed in response to differing environments. Horses, cattle, sheep, pigs, etc. were available only to the Fertile Crescent cultures and, later, to those cultures connected to the Fertile Crescent. Peoples in the Americas and Polynesia had to adopt without these animals. Some cultures were subject to easy attack from nearby peoples. Some were isolated by geography (Diamond, 1997). Differing forces of evolution required differing solutions. Therefore, differing moralities of reproduction, counting, language, treatment of the next generation, treatment of the last generation, views of strangers, and views of friends developed. The cultural adoption includes visual perception, spatial orientation, analytical versus holistic reasoning, motivation to conform, making choices, and concept of self. Many similarities of development of the organization of societies also developed (Diamond, 2012).

Nature is neither kind nor forgiving. History has shown that nature will win. If humanity ignores nature, the collapse will only be more destructive.

Technology has masked the true conditions nature imposes on us to a large degree. The problems encountered by older societies and less technically developed societies differ considerably from the problems in the U. S. Other successful societies have had practices we consider abhorrent such as infanticide of the weak or excess people (Moses was sent down the Nile); abandoning or killing elderly people (Moses was abandoned before crossing the river); facing periodic starvation, high child death rates; and living in fear of imminent attack (Diamond, 2011). Having excess food to support the weak or infirm that have little hope of ever contributing to others is rare in nature. Food production is a high technology endeavor. The U. S. has adopted practices that reflect a rare and fleeting condition in nature. If we fail to change, nature will select against us when an ice age returns, when food availability is reduced, when the population becomes excessive, or when competitors use resources

better.

Diamond (2012, and references therein) summarized the development to larger organized groups by increasing organizational levels of the family, band, tribe, chiefdom, and state. As a power base becomes entrenched, it must be motivated and be able to accept leadership from another power base with another type of organization. For example, the chiefdom organization starts to become a state when one chief is given authority over other chiefs to protect the group.

For example, the Magna Carta is a document that forced the king through the threat of violence by chiefs (feudal barons) to limit the king's power against the chiefs and to protect the chiefs' privileges against the new, central authority. The barons were moved to this radical step of reorganization by foreign threats to their combined strength, by high taxes by the king, by unsuccessful wars that threatened the barons' property, and by the oppressive government of King John. The Magna Carta initiated the rule of written law of the state rather than the rule at the will of the central chief (king). This led to the state with written, constitutional law in Britain. The Magna Carta was used as a model for the American colonies to develop their own legal system.

The evolution of larger organizations has resulted in lower rates of violent deaths (Morris, 2014). Collapse is the change from larger organizations to smaller ones. The higher rate of violent deaths follows.

Many current organizations called "nations" have a tribal or chiefdom organization. Some "nations" are little more than one tribe king ruling other tribes. No "nation" today has a sufficiently different organization from a state to qualify as a new social science structure of a nation.

The growth from one level to the next requires a major paradigm shift. The prime growth problem of developing the next level organization is that each individual in a sub-level must tolerate individuals in other sub-level organizations without recourse to violence. For example, individuals in one tribe must not attack an individual from another tribe with different social practices. Increased tolerance of other views and organizations results in the progression from family to band, to tribe, to chiefdom, and to state. The U. S. is a result of a successful application of this principle.

The problems for humanity are war and the disruption of collapse. War and collapse not only involves selection but also destruction of many positive elements developed by humanity along with the elements nature rejects. This makes the identifying of successful characteristics difficult. For example, Rome made great strides in technology and organization. Rome's collapse voided the great strides. Europe took a thousand years to rediscover how to build like Rome.

Material conditions alone do not allow the development of larger societies.

The Fertile Crescent had a head start in developing food production, technology, and state government. Why didn't the Fertile Crescent develop the technology of the European cultures? The Fertile Crescent societies became static and intolerant. The leaders wanted to maintain power and, therefore, inhibited change. Individuals moved west and east (Diamond, 1997). This trend continued as the center of change moved to southern Europe, to northern Europe, and to the Americas. Tolerance of many social and moral models and change as new models are developed are key characteristics needed for a society to survive. The movement of people and their resources (money, knowledge, abilities, etc.) from intolerant societies saves humanity's knowledge.

Goldin (2013) remarked "Too often reforms in global governance are equivalent to rearranging the deckchairs on the *Titanic*." Humanity needs to form a new ship.

This paper suggests that the progress of both physics and humanity is in need of new fundamental principles. The sphere of life experience and the sphere of science experience may contribute to each other. Thus directing how we should steer humanity. Section 2 discusses the fundamental principles of life that may apply to physics. The fundamental principles of physics that apply to life are discussed in Section 3. The Discussion and Conclusion is in Section 4.

2 The fundamental principles of humanity that apply to physics

Individuals have a birth and a death. Birth is a rearrangement of existing matter to create a new relationship or spirit. Throughout the individual's life, the matter and the spirit change. Eventually the individual dies. The spirit stops and the accumulated resources (matter) are returned to the universe.

Life also reproduces. Reproduction is making new self-similar copies of the life form. Reproducing more copies than the environment can support is also part of life. This is a tremendous waste of energy encouraged by nature. The fractal universe philosophy should be promoted to a fundamental principle. That is, the universe is a collection of reproduced mechanisms.

Life eats other life. The ultimate source of life is the energy from physical processes such as suns. Life on Earth tends toward increased rates of entropy growth because Earth is an open system with energy supplied by the Sun. The fractal philosophy suggests the universe must also be an open system. This suggests the universe is not adiabatic (Hodge, 2006a).

Life units have physiological processes specifically pertinent to the function-

ing of integrated living units such as cells, tissues, organs, and organisms. More complex living organisms can communicate through various means, which is part of the functioning of an integrated unit. A unit induces a change in its environment that travels to the other unit such as laying a chemical trail. A change in state or activity occurs as a result of a stimulus. An organism changes in terms of movement, secretion, etc. Change requires a stimulus by contact not by “action-at-a-distance”.

Organisms possess a capacity to grow. Those life forms not growing are dying.

Organisms maintain homeostasis. A negative feedback loop is postulated to approach homeostasis instead of “fine tuning” in any form. Further, if the measurements suggest “fine tuning”, then the physical mechanism is part of a negative feedback loop. For example, the ratio of the central mass to the mass of the bulge is constant implies there exists a negative feedback mechanism (Merritt & Farrarese, 2001). The problem for physics is finding the feedback loop. The discovery process begins with the fundamental principle that the universe is composed of nested, negative feedback loops.

Combining fractal philosophy and the feedback principle suggests proportionality constants are also the result of feedback loops. This structure repeats down to very few (perhaps one) relationship(s). For example, the equivalence principle could be the result of a basic relationship(s).

Evolution suggests a change principle that states that change steps are small. A repetition principle states that there are two ways to repeat a change: (1) If a condition allows a change, then the change will occur again under similar conditions. (2) The repeated changes have common causes. That is, if two systems show similar results, then similar conditions exist.

The cooling flow from spiral galaxies is a loss of energy by matter that is too hot for the elliptical galaxies. The infall nucleosynthesis and the formation of suns serves the same purpose in spiral galaxies. The development of life requires more energy than lack of life development. The inflow of matter into spiral galaxies causes the development of suns and of life. This is more time efficient than cooling flows for increasing entropy.

Similarly, life serves the purpose of dissipating energy, also. A developing model of life proposes life is more efficient at eating energy and dissipating energy as heat (England, 2013; Crooks, 1999). This process is constrained by the laws of thermodynamics. The rate of increase in entropy is higher for life and the complex organisms than for the mineral components of the universe. The evolution of life is toward a greater rate of entropy increase. This idea balances the natural selection of evolution to include the rate of entropy increase alongside the efficiency requirement of survival-of-the-fittest.

These principles are used in the STOE (Hodge, 2012a).

3 The fundamental principles of physics that apply to humanity

The practice of science also has been evolving from Thales to Popper and other modern thinkers. The modern science practice is to develop many models to describe observations. These models have anomalies that seem to fall outside the model. Models are often inconsistent with other models. For example, General Relativity is inconsistent with quantum mechanics today. The growth challenge is to form one model that corresponds to both areas of applicability.

Underlying the models is mathematics, which is a counting of standard measurement units and the relationship of numbers and geometries. Before science can use mathematics, measurements must be defined. Commonly accepted standards allow many scientists to test and to confirm results of others.

The fundamental problem for humanity from a scientific view is that societies and morality lacks a common measure of how evolution and natural selection will ultimately judge them. The natural selection process suggests the measure is the survival of a set of morals and organizations that function in differing environments (Hodge, 2012b; Diamond, 2011). The morality of survival dictates that if the society will not obey nature's quest for evolution, nature will select against the society. Survival is achieved through successful competition, change, and efficient resource use in a changing environment.

The practice and advance of science has demonstrated that cooperation is the best form of competition. But failing the best form of competition, nature uses war and collapse to achieve competition.

Survival is a long-term measure. Therefore, a first time derivative function is necessary. People in the past have voted with their feet. Technology has made the movement of people and their resources easier. Instead of a state failing through war or collapse, the people and their money resources leaving the state will obey nature's judgment without great destruction. For example, the cost to maintain slavery and prevent slaves escaping could have ended slavery in the U. S. rather than federally mandated slave return in the North and fighting an expensive war.

Because a society is operating with a survival-of-the-fittest pressure, energy efficiency is required rather than increased entropy. The physics of the minimum action principle suggests that the political hierarchy should not duplicate actions. Therefore, the national authority is solely responsible for international affairs including the military. However, the taxing authority and regulation of individuals are currently much duplicated, which is wasteful. This could be eliminated at the national level by the states, not individuals, paying the national budget. The nation must establish a rule of written law between

states but not between individuals, establish courts to administer relationships between states and between branches of the governing bureaucracy, and establish tolerance for non-violent competition. The states should be allowed to enforce their set of morals without national interference. For example, one state may be Jewish, another Moslem, another totalitarian, another socialist, etc. Free movement of people and their resources should be allowed.

The stress of our complex society requires an organizational change like the replacement of the Articles of Confederation in 1789. The trial-and-error method of one national authority is too expensive and too time consuming. Failure to adapt will cause a collapse to a simpler society.

The fundamental task of a perpetual national organization in a political society is to reflect nature's conditions relative to subordinate organizations (states). If the superior authority fails to reflect nature's laws, nature will kill the authority. Deciding internal policies must be left to the states that can compete for the best set of policies that nature will not kill. The tendency of a central authority to overrule states is very strong. This tendency must be more strongly prohibited. Thus the lack of understanding can be overcome by trial-and-error methods. Therefore the risk of a policy failure is visited on one state rather than the nation. The other states may learn and the nation will become stronger.

Currently, the only recourse nature has for a policy failure is to destroy the "nation". The number of past civilizations attests that nature will kill us. Change to obey the laws of nature or die is a law of nature.

Living together harmoniously is not the goal. A smoothly functioning society is not the goal. A similar social pattern among the states is not the goal. Only survival and ending violent war are the goals.

4 Discussion and conclusion

Evolution continues to happen. The size and power of nations continues to increase. The U. S. is now the leader in this evolution. If we don't either reorganize the U. S. or the U. N., nature will select against us. The measure of success is survival.

Life and science are in one universe. A fundamental principle is one that applies to both.

Humans lack sufficient knowledge to predict outcomes of actions. Therefore, a trial-and-error method must be adopted.

A new constitution may also serve as a model for a world government. The League of Nations and the United Nations were attempts to form a one-world government to preclude war. The Constitution of the United States as

originally adopted in 1787, which was created to help states deal with foreign issues, could have been such a model had the extension to individual rights been left to the states and had the states the authority to overrule the national authority in state matters. The current period in the U. S. is like the period before the Magna Carta. Inhibiting change is not an option.

The national military authority must obey and enforce nature's laws. Competition must be allowed between religions, between approaches to organization, between approaches to technology, and between approaches to the environment.

If we fail to organize to preclude war and allow competition and change, humanity will fail. Humanity should steer the future by creating a true nation organization. The best state that humanity can achieve is to be able to adapt to changes without the destruction of war or of collapse.

The barons are organizing.

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