

## Testimony Supporting Vigorous Climate Action (SB1530)

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I'm John Weigant, and you represent me. My testimony is about the Big Picture, not details of SB1530. Your decisions affect all of us, now and for generations to come. As a futurist, I ask you especially to consider the impact of your decisions on your future constituents, your own children and grandchildren. Most of your constituents see life in the context of the past and the present, and what they want now. Please look past their requests to see the future ahead.

Life on earth is a complex of systems. We need systems thinking<sup>1</sup> to trace their inputs, processes, outputs, stores and delays. A brilliant MIT team, using Systems Dynamics, told us 50 years ago the human race is headed for disaster<sup>2</sup>. We can no longer delay *strong* corrective action. Some disaster is now certain, but immediate strong action will lessen it for future generations, our children, grandchildren, and their's. We are headed to collapse. Start hard choices now, or Nature's inevitable response will be far harder. My testimony focuses on the systems that have guided past decisions, good and bad.

System 0, the Universe, is governed by the laws of physics, which are constant, immutable, elegant and precise beyond understanding. The conservation of mass, energy, electric charge, momentum, and a few other things combine to tell us the human race is essentially earthbound, so we must learn to live within its limits. If we trash it, there's no place nearby worth going to, and the closest stars are too far to reach in the time available. This elegant universe popped into being over 14 Billion Years Ago (BYA).

System 1, our Solar System. Our tiny part of the universe began about 4.5 BYA, coalescing by gravity from local hydrogen gas and the ashes of one or more prior stars. Water, "the universal solvent," came quickly. Rain washed salts into ocean soups, stirred by lunar tides. Carbon's amazing chemistry could form complex chains that could copy themselves. Water, carbon and sun energy are the basis of life.

System 2, Evolution, began about 4 BYA, following all System 0 and 1 laws, organizing itself out of chaos. Carbon molecules learned to copy themselves from raw materials. The rate of copying was limited by resources from which to make copies; that's still true. Some copies were imperfect, called mutations. Most imperfect copies died young, but a few were improvements, and survived better to pass on their strengths. Some of these carbon compounds "learned" photosynthesis, to use solar energy to pull CO<sub>2</sub>, a greenhouse gas, from the air, storing that energy in carbon compounds, and returning free oxygen (O<sub>2</sub>) to the air. (In 1859, Charles Darwin called it "natural selection" of higher quality offspring. A contemporary, Henry Wallace, called it "survival of the fittest".)<sup>3</sup>

System 3, Information, was a player from the beginning. The atomic linkages of the replicating organic compounds could be copied, acting as strings of information. Some of these strings of "genes" developed into matched pairs, "chromosomes." The pairs checked each other for errors, keeping copies similar and true. *A gene has a simple goal: copy itself into the next generation.* Any gene failing this goal soon becomes extinct. Genes cause behavior, "instincts". Some of our behavior is instinctive.

System 4, Sex. About 2 BYA, an evolution subsystem began: tiny organisms learned to exchange genetic information, a powerful new way to promote change. The genetic codes that specified life processes made new *combinations*. Change exploded. Today, nearly all forms of higher life, plant and animal, reproduce sexually, rapidly. One fundamental remains: everything born must die, but most offspring die young, before they reproduce. Nature's process is one of *quality improvement*, with many births, more than local resources can support. Then weed out lesser quality offspring by what The Bible

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<sup>1</sup> *The Fifth Discipline, The Art and Practice of the Learning Organization*, 2006, Peter M.Senge

<sup>2</sup> *The Limits to Growth*, 1972, Meadows et al., followed by *Beyond the Limits*, 1992, and *Limits to Growth, The 30-Year Update*, 2004,

<sup>3</sup> Compare Earth to "our sister planet" Venus. Closer to the Sun, liquid water never formed, and water vapor was blown away by solar wind. Now its atmosphere is 96.5% CO<sub>2</sub>, its surface temperature is 867 °F, and surface pressure is the same as on earth under 3000 feet of water, a victim of runaway greenhouse gas. (Wikipedia)

calls the Four Horsemen of Apocalypse: War (predation on ourselves), Starvation, Plague (predation by pathogens), and Strife (abandonment, social collapse), all most effective against the young.

System 4A, More Quantity. Parents can help their genes survive to the next generation by making many offspring, the general strategy of plants. How many seeds does an apple tree make in its lifetime? On average, just one seed survives long enough to reproduce in turn. A female octopus lays 80,000 eggs, then dies to be first food for her hatchlings. Some long-lived fish produce millions of eggs, yet if their numbers remain stable, on average only one pair survives to reproduce, typically in cycles of slow growth, then sudden decline. The natural result of more offspring than resources (the environment) can support is a high death rate, especially of infants. In essence, limiting *quantity* raises *quality*.

System 4B, More Quality by Territoriality. One way to move better genes to the next generation is by *territoriality*. A strong *alpha male* carves out a “territory,” denying other males access to a major resource of the territory: females. Being stronger and more aggressive, his genes make it to next generation, with his strength and aggression. The genes of the excluded weaker males die out. Among higher species like mammals, making a baby takes seconds of effort for a male, but months for a female. One dominant male can impregnate many females. Humans are a territorial species: King David had 1000 wives and concubines. Islam, under Mohammed, limited wives to four. In isolated hunter-gatherer cultures like Papua New Guinea, Amazonia, and Aboriginal Australia, wives are bought as young men accumulate wealth. Early human societies grew from hunter-gatherer families to clans, usually led by a “big man,” chosen for leadership ability. Clans grew into tribes, which grew into chiefdoms, nearly always headed by hereditary chief. Chiefdoms grew into kingdoms, with hereditary kings<sup>4</sup>. The kings (alpha males) required tribute (taxes) from subjects, with which he hired a bureaucracy of “beta males” to keep order, and make war. Alpha females bonded with alpha males. In patriarchal societies, the parents’ genes and wealth both passed to the next generation, giving it better genes and more resources to be strong and prolific. Adultery was punishable by death, since it confused genetic lineage, allowing a stranger’s son to inherit the family wealth. Alpha males measured their strength by wealth. The easiest way for kings to get wealth was to steal it from neighbors<sup>5</sup>, drafting young males into armies, isolating them from local women, seizing neighboring women, and killing neighboring males.

System 4C, More Quality by Nurturing. Higher animals like birds and mammals invest much in pregnancy and nursing their young to the point of self-survival. A human baby needs 9 months in the womb, is born premature, then needs about six years of nurture to survive, or in modern high-information culture, over 20 years before they’re ready to reproduce, in their turn. To overcome life’s hazards—predators and pathogens, storms and starvation—several offspring were needed for a species to survive. Species developed a balance between birth and death rates. Early humans needed several children, expecting just two to live long enough to replace themselves. Humans kept learning, and recently<sup>6</sup> cut death rates so populations grew fast, exceeding local resources. Populations faced natural cycles by one or more of the Four Horsemen. Sex drives to create children didn’t change, and still operate.

System 4D, Socialization. The alpha male kings brought both defense and order to their subjects, organizing public works, temples, agriculture, laws, and cities, using civil and military bureaucrats to help keep order<sup>7</sup>. Previously, order was maintained by fear and vendetta: “don’t damage my family or I’ll kill you and your family.” Governments sought to take over justice issues, away from individuals. Religions formed similar rules for living together, and to get help controlling chaotic events like storms, droughts, floods, fires, plagues, and the like, that weren’t controlled by people, so it must be controlled by the gods. Religions needed their own set of alpha and beta males, a priestly class. Kings and priests found it convenient to work together, each in their own realm. The priests and prophets interpreted and recorded what the gods wanted, and their books became sacred. Most of the gods’ rules reflected human experience, but coming from God, they were beyond challenge and became sacred and eternal. God

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<sup>4</sup> *The World Until Yesterday, What Can We Learn From Traditional Societies?*, Jared Diamond, 2012

<sup>5</sup> *Fields of Blood, Religion and the History of Violence*, Karen Armstrong, 2015

<sup>6</sup> E.g. Penicillin, the first general antibiotic, came into use in 1942. The atom bomb, 1945, made modern war insane.

<sup>7</sup> E.g. “Code of Hammurabi” was a code of 282 laws of a Babylonian king, dated to about 1754 BC (Wikipedia)

became a Top Alpha Male, supported by a hierarchy of beta male priests, some claiming alpha status. Socialization was a learned response to the worst territorial behavior, but the underlying territorial instincts remained, because the differential survival of the behavior remained.

System 5, Secularism. “Secularism is sometimes described as the negation of religion. ... Self-professing secularists view secularism in a very different way. For them, ...[it’s] defined by a coherent code of values rather than by opposition to this or that religion. ... This ethical code ... enshrines the values of truth, compassion, equality, freedom, courage, and responsibility. It forms the foundation of modern scientific and democratic institutions.”<sup>8</sup> Emerging science (information) reinforced secularism.

System 5A, Secular Economic Religions. A dictionary definition of “religion” includes “a cause, principle or system of beliefs held to with ardor and faith.” That definition includes economic systems like capitalism, communism, fascism, and feudalism. Each of these is territorial in nature, typically with “prophets”—Adam Smith, Karl Marx, or Adolph Hitler. Each competed in its time and place for territory and dominance, supported by strong militaries. Capitalism proved to be the most efficient, since “the invisible hand of the market” made better decisions about production and reproduction. Just as biological evolution promotes diversity, allowing a species to develop in every ecological niche, so does economic evolution promote diversity, with a business in every economic niche. Limited liability corporations evolved, so if the business failed and died, its stockholders (owners) couldn’t be held responsible for debts or damages. They may lose their investment, but not their fortunes. In 1776, three big changes happened to change societies. Even so, societies have “momentum,” and change slowly.

System 6, Democracy. (1) American colonies declared independence from Great Britain, with a long list of grievances against its alpha male king. They tried a limited form of government, but in 1789, they started over and created a *republic* where power was checked and balanced among three equal branches of government. The goal was a strong executive branch to do the business of government efficiently, but with measures to prevent territorial alpha males seizing excessive power and rising above the law.<sup>9</sup>

System 7, Industrialization. (2) Also in 1776, James Watt invented the rotary steam engine, starting the Industrial Age. Prior to this invention, most power came from the muscles of men and animals, aided where convenient by wind and water power. After this invention, and the internal combustion engine in 1876, energy stored in fossil fuels (coal and oil) began to power everything. What took 4 billion years for plants to extract from the air is rapidly being replaced in less than 250 years. Its use is increasing, partly because its demand drivers—human populations and their technology—keep increasing. We must return to our planet’s original energy source, sunlight, which has sustained us for 4.5 billion years.

System 8, Capitalism. (3) Also in 1776, Adam Smith published “*The Wealth of Nations*, considered his *magnum opus* and the first modern work of economics. ... Smith laid the foundations of classical free market economic theory. *The Wealth of Nations* was a precursor to the modern academic discipline of economics. In this and other works, he developed the concept of division of labour and expounded upon how rational self-interest and competition can lead to economic prosperity.”<sup>10</sup>

The brilliant framers of our Constitution understood perfectly well the hazards of alpha males dominating government, but they had little experience protecting citizens from the alpha males of Industrialization and Capitalism. The captains of industry literally captured raw power. The Greek roots of “economics” mean “family management,” and the captains of the capitalism took control of families in new ways. Capitalism’s “the invisible hand of the market” makes more *efficient* decisions. But *efficiency* and *equity* aren’t the same, and the alpha males who topped corporate industries wanted to maximize their own power and wealth. They hated regulation, which restricted their freedom to maximize their wealth<sup>11</sup>, stealing it from their workers and customers. For example, the food industry was rife with pollution, and consumers had no idea the industrial food they ate was laced with poisonous preservatives and unsanitary production. In 1906, Upton Sinclair wrote a novel, *The Jungle*; emerging awareness of corporate abuse in

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<sup>8</sup> *21 Lessons for the 21<sup>st</sup> Century*, Yuval Noah Harari, 2018, chapter 14

<sup>9</sup> We have just seen those provisions fail in the Senate.

<sup>10</sup> “Adam Smith”, Wikipedia

<sup>11</sup> Government have always regulated. About half of the Code of Hammurabi dealt with economic issues.

the food industry aroused the public to insist on regulation<sup>12</sup>. Taxes, properly applied, can also improve equity. Corporate America continues to fight regulation and taxes of their industries and themselves, controlling laws with money and loopholes. Their wealth is increasing rapidly. For example, the average income between 2011 and 2016 of the CEOs of the top 100 corporations was 793 times the annual income of their average worker. In 1970, it was only 48 times as much.<sup>13</sup>

Does territorial behavior continue to influence society? Of course; it's genetic. Look at President Trump, a classic alpha male, offering benefits (jobs) to beta-male supporters. His trillion-dollar deficits pay for those jobs, charged to our children to pay back. The gun lobby seeks to perpetuate a tool of power-at-a-safe-distance to project power without the hazards of personal combat. Women have traditionally had fewer rights than men. With increasing populations driving further climate change, people still seek to force women to have babies they don't want. Races are still treated unequally, based only on their surface appearance.

Change is driven by new information. New genetic information advances slowly, both in time and distance, measured in generations and migration rates. Technical information grows exponentially, limited by Moore's Law<sup>14</sup> and the speed of light. Of sensory information in the environment, one source says only 0.045% of it is consciously perceived by the brain<sup>15</sup>. Genetic information, by design, drives inequity. Cultural information, as recorded for 4000 years, drives our families, societies, and friends to peaceful coexistence. Our government was designed to be secular, with impeachment to stop alpha male behavior and restricted religion, but based on truth, compassion, and equality. Nature seeks inequality, survival of the fittest, the rest be damned. *Quality* is a root of *Equality*. *Quality* is really all we want.

Let me summarize: This is a battle for quality of life, whether it can be shared by the many, or cornered by the few. The laws of physics, mapped by system dynamics, say the current path leads to human disaster, with about a third of world human population dying before this century's end<sup>16</sup>. Civilization collapse is a possibility, as desperation to survive strips the world of accessible resources, increasing waste and pollution in the process. As life gets brutal and competitive, expect the instincts of territoriality to overwhelm the teaching of socialization. The quality of remaining life will be stark: life expectancy of about 35 years. The short-sighted path may improve next quarter's profits, as corporations want. So listen to the environmentalists, who understand these issues better. A sun-powered electric life can still be good, but population growth must—and will—stop, an issue with many legislative impacts.

We are all causing the problem of climate change, which is just one of the growth disasters we face. So we must all be part of the solution, a little belt tightening now. Your responsibility is to our children and grandchildren, and theirs. It exceeds your responsibility to individuals and corporations seeking to maximize their wealth by polluting our environment. In economics, pollution is an "externality," private gain at public cost. Don't allow it. The necessary changes we face are just starting.

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<sup>12</sup> See also Public Broadcasting System, *American Experience* #3202, The forgotten heroes who fought for food safety at the turn of the 20th century are highlighted. (See also "Harvey Washington Wiley" in Wikipedia)

<sup>13</sup> *Runaway Inequality*, Les Leopold, 2018, page 10

<sup>14</sup> Moore's Law: The number of transistors on an integrated circuit doubles about every 2 years, at constant price.

<sup>15</sup> *The Visual Miscellaneum*, David McCandless, 2009, page 105

<sup>16</sup> *Limits to Growth, the 30 Year Update*, 2004, Meadows et al, Scenario 1, business as usual.