Title: Quantum Quackery

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Abstract: Peer review is no panacea; every generation must reevaluate empirical evidence in the context of its own time. For a century, quantum mechanics has defied common sense. However, common sense dictates that the stability of molecular bonds contradicts probabilistic, leaping electrons. In fact, Bohr's quantum leap scenario violates the second law of thermodynamics and contradicts phase transition temperatures. Bell's inequality, a specious proof of quantum mechanics, derives from a false premise whose revelation by Joy Christian went widely unnoticed. Consistent in every detail with holographic virtual images, Young's double-slit experiment generates diffraction patterns with coherent light, even one photon at a time, while incoherent light does not. Hence, interference pattern analogies are flagrant misrepresentations of the facts. With no basis in fact, the blind-leading-the-blind faith of quantum mechanics twisted inductive speculation into a Gordian knot of mass delusions. As long as peer review science chooses to legitimize theoretical speculation, the demarcation between science and pseudoscience will remain indefensible.

One Sentence Summary: Bohr was wrong and Einstein was right, "God doesn't play dice with the world."

Main Text: My greatest fear is that people will never learn to distinguish truth from fallacy. Too often, peer review and peer pressure prevail over logic. Galileo discounted expert opinion in favor of direct observation, Alexis de Tocqueville labeled it the *tyranny of the majority*, David Hume the *is-ought problem*, and Thomas Paine *precedence* versus *principles*. Precedence deserves no monopoly on truth. In logic, only deductive arguments are valid. Just as inductive arguments are invalid. Valid and invalid are not the same as true and false. However, only deductive arguments render legitimate proofs. Deductive reasoning embodies causation. Causation is all or nothing cause and effect. Inductive speculation employs correlation. Correlation is something from nothing pattern recognition. For truth seekers, causation is superior; correlation is inferior. Correlation does not imply causation.

The scientific method discovers empirical facts from experimental evidence and natural observations, which represent legitimate reality checks for hypothesis falsification. However, theories are neither proven facts nor valid logic. A recipe is deductive reason with reality checks. For good cause a recipe lists its ingredients first. Without all the ingredients a recipe cannot be completed. Mathematical proofs are recipes with self-evident axioms as recipe ingredients and mathematical rules as recipe instructions. However, theories rely on faith not reason, trust not truth. For truth to prevail, recipes must supplant theories in science and public discourse. Only recipe science in general and recipe physics in particular can legitimately promise to right theory's indefensible wrongs of inductive speculation. As proof, let's test your faith in quantum mechanics in light of empirical facts.

Double-slit experiment. We might forgive misinterpretations of Young's double-slit experiment before the advent of laser holography, but not after. Young first performed his experiment around 1800 by shining light over edge-on card stock. Newton reproduced Young's results with a hair. We can perform Young's experiment sitting in a car at night, as we look in the rear view mirror at distant street lamps and traffic lights. If the rear window has an embedded heating element, then the heating element strips act as horizontal diffraction gratings that diffract light sources into multiple vertically displaced copies.

Newton postulated that light is corpuscular in nature. However, Young's experiment fostered a wave theory of light. Not until Einstein's Nobel Prize winning interpretation of the photoelectric effect, the solar cell principle, did the concept arise of photons with wave-particle duality, so Newton was posthumously vindicated. Misinterpretations of Young's experiment assume an interference pattern analogy as produced by a pair of ripple waves. However, an interference pattern only appears with coincidental ripple waves. No interference pattern appears with one ripple wave alone. With Young's double-slit experiment, one coherent photon at a time generates a diffraction pattern sans interference just like a holographic virtual image.

In laser holography, two independent, coherent wavefronts record an interference pattern on high resolution film. One wavefront is the illumination or object beam that scatters coherent light off a scene onto the film. The other wavefront is the reference beam that shines coherent light directly onto the same film. The two wavefronts interact to form an interference pattern recorded over the intensity range of peak gain, constructive resonance, to total loss, destructive cancellation. The film is then processed to produce a hologram. A reconstructed reference beam shining on the hologram generates a 3-D virtual image that appears in the same relative location as the recorded scene and responds like the real scene when the viewer changes position, but viewing a hologram with incoherent light reveals no discernible details of the virtual image.

Interference misinterpretations of Young's double-slit experiment ignore the diffraction implications of one photon at a time, and totally fail to consider the material containing the double-slits, which manifests a very crude, manmade hologram. Coherent light shining on the crude hologram generates a diffraction pattern as a manufactured rather than a recorded 3-D holographic virtual image, but incoherent light that reflects off or transmits through the crude hologram reveals no discernible virtual image. Coherence is destroyed or degraded by trying to detect which of the two slits is traversed by each photon, electron, or molecule. In hindsight, impotent peer review proved guilty of negligent culpability. Look before you leap.

Quantum leap. How many examples come to mind that preserve temporal continuity but manifest spatial discontinuity? Stories and movies do, "Meanwhile, back at the ranch." However, both examples are purely imaginary, and so is Bohr's quantum leap scenario, which violates the second law of thermodynamics. Heat only transfers in one direction, from hot to cold. Thermal energy is absorbed, emitted, and transmitted as photons of electromagnetic radiation. Yet if quantum leaps did occur as Bohr proposed, then an electron in the first orbital could absorb photon one of two to reach the second orbital, absorb photon two to reach the third orbital, and then emit a photon with their combined energy, when the electron drops back to the first orbital from the third orbital. However, the photoelectric effect threshold depends on photon energy not photon intensity, which contradicts Bohr's quantum leap scenario. With photon energy, all change occurs through bifurcation not through union. The quantum leap scenario fails a reality check and every peer reviewed atomic model accepted since then incorporates Bohr's house of cards. To plagiarize Einstein's big bang quip, Bohr's math was correct but his physics is

abominable. According to Galileo, mathematics is the language of God. Galileo affirmed his faith that scripture cannot err, but questioned the veracity of human interpretations. Now mathematics is the scripture of quantum mechanics. However, empirical evidence and reason dictate an alternate reality. Contradicted by empirical evidence, Bohr's quantum leap scenario predicts consistency between phase transition temperatures.

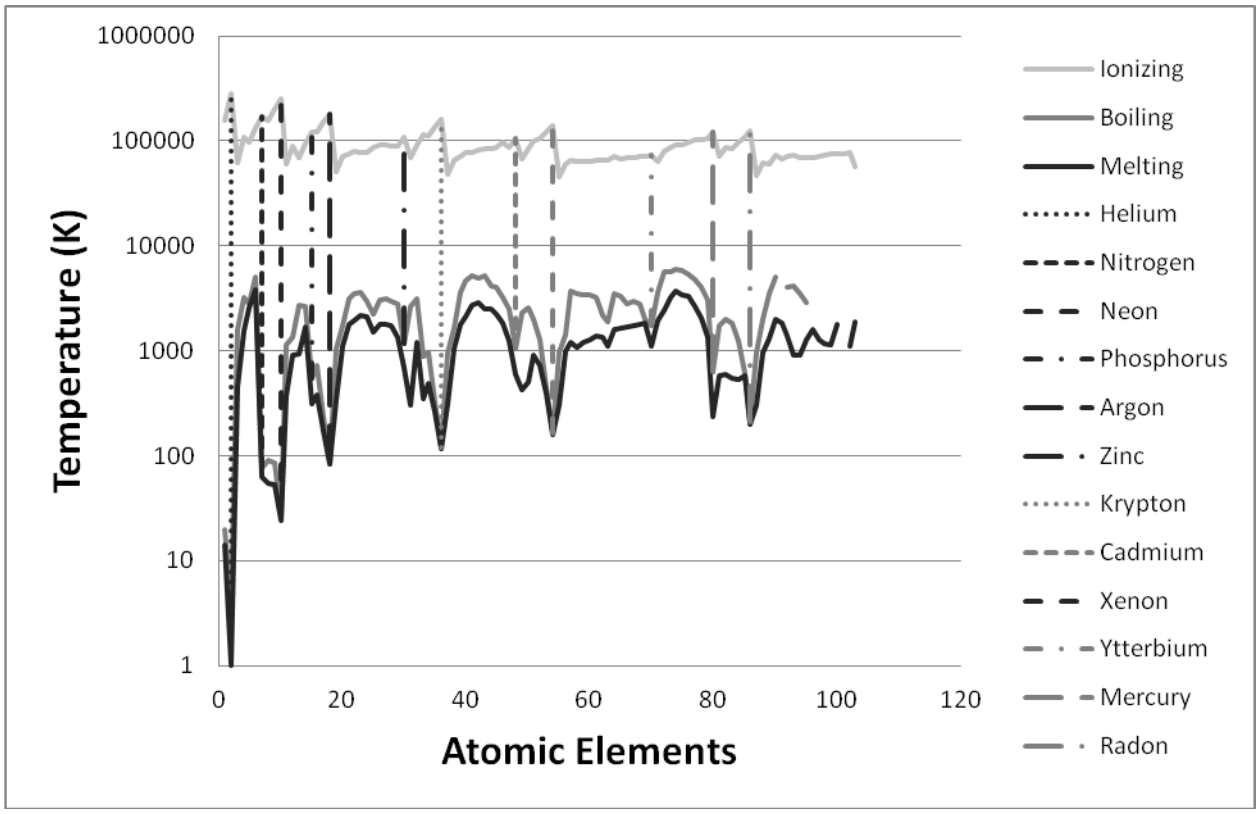

Fig. 1. Atomic Element versus Phase Transition Temperature (*19*)

Phase transitions. Figure 1 shows that temperature trends at the ionizing phase transition are out of sync with melting and boiling point temperature trends. Atoms absorb and emit photons to transition between states of matter. Atomic elements with lower melting and boiling point temperatures than neighboring elements exhibit paradoxical higher ionizing temperatures. Lower melting and boiling point temperatures mean absorption of lower energy photons. Whereas, higher ionizing temperatures mean that higher energy photons are necessary to eject electrons. This suggests that photon absorption strengthens atomic electron bonds, which makes electrons harder to dislodge. Quantum mechanics is a fallacy as formulated by and derived from Bohr's quantum leap scenario. Electrons are not knocked up into higher and higher orbitals by photon absorption, and a century of peer reviewers missed this fact.

At least since Rutherford, atomic models assume that electron-proton parity is the norm for solids, liquids, and gases; while electron deficits make positive ions, and electron surpluses make negative ions. If true, then what causes phase transitions between states of matter, since electron count does not vary in Bohr's house of cards? Yet phase transitions are discrete like electron counts. If photon absorption triggers electron gains and photon emission triggers electron losses then we have a recipe that passes phase transition reality checks, for the simple reason that more

numerous atomic electrons repel other electron clad atoms with greater force. If we touch a Van de Graaff generator then our hair stands on end because electrons repel each other. Gas molecules repel each other too, but do these two phenomena share a common principle in electron count? Electroplating and electrolysis convert liquid solutions into solids and gases through the exchange of electrons. Boiling water makes bubbles near the heat source that rise to the surface. When it converts to steam, liquid water increases in volume by a factor of 1600. Why is water vapor dramatically less dense than liquid water? Electric charge is stronger than gravity by an order of 10^{36} between protons and 10^{42} between electrons (*1*).

Consistent with atomic contraction through photon absorption and electron gains, black body radiation emits a greater number of shorter wavelength photons the hotter the temperature. Yet objects expand when heated, as if by stronger repulsive forces between atoms, while objects contract when cooled, as if by weaker repulsive forces between atoms. The ideal gas law relates pressure and volume to temperature, but what is the mechanism? The ideal gas law nominates thermal kinetic energy, which is a descriptive theory not an explanation. A theory is a correlative description. A recipe is a causative explanation, like photon absorption causes atomic contraction and stronger election bonds result in more concentrated electric charge, which permits longer path lengths between collisions with greater elasticity. In weather patterns, high pressure is hot lower density air consistent with electron gain by photon absorption, and low pressure is cold higher density air consistent with electron loss by photon emission. Furthermore, photon absorption at the ionizing phase transition sends atomic electron bonds into catastrophic failure. Combustion produces plasma that emits photons and electrons from atoms, like electron loss by photon emission just as an inflating balloon suddenly bursts.

A recipe must pass a complete reality check like a mathematical proof, while a theory exhibits the same cognitive failings as prejudice. Kuhn proposed that anomalies instigate scientific revolutions (*2*). However, in defense of scientific theories the skeptical inquisition rivals the Vatican's attack against Galileo. On theological grounds it was impossible for Jupiter to possess moons. Therefore, looking through Galileo's telescope was pointless. In our world, dust particles levitate, and dust storms exhibit static electricity. If a grain of sand charged with static electricity can levitate, then why not a BB, or a ball bearing, or a cannonball? Hutchison made video of a levitating cannonball (*3*). However, based on the laws of nature known to man the skeptical inquisition argues that the Hutchison effect is a fake. Hutchison uses a Van de Graaff generator and electromagnetic signal generators, which are the proper ingredients to produce electron gains through photon absorption. However, Hutchison fails to record and publish his equipment setup and signal frequencies for others to reproduce his results in accord with the scientific method. Nevertheless, the skeptical inquisition inhibits free inquiry and labels anomalies as fakes to derail Kuhn's revolutions. If we can levitate a grain of sand, a BB, a ball bearing, or a cannonball charged with static electricity through photon absorption then Bohr's house of cards collapses, and the skeptical inquisition deserves a large part of the blame. Einstein felt that quantum mechanics represents a statistical approximation to an undiscovered local reality.

Local reality. Let's formulate a local reality recipe from basic principles. The fabric of the universe is woven from three force fields: electric, magnetic, and gravitic. In our space-time continuum, this trio of force fields manifest as electromagnetic radiation, electric charge, magnetic poles, and gravitic mass. The best mathematical model exists for a photon of electromagnetic radiation. Maxwell's equations describe the dynamic behavior of electric and magnetic fields. Electric and magnetic fields are codependent, where a changing electric field

generates an orthogonal magnetic field, and a changing magnetic field generates an orthogonal electric field. Mathematically, Maxwell's equations formulate electromagnetic radiation, where the speed of light emerges as a natural property. The model for a photon manifests along three orthogonal axes. Sinusoidal electric and magnetic fields occupy one axis each, where wave amplitude relates to field strength not position. The third axis manifests translation in space at the speed of light. Next, let's extend this photon recipe to subatomic particles.

Electron and proton subatomic particles manifest electric charge, magnetic dipole, gravitic mass, but no light speed translation. So we need to otherwise employ the photon translation axis. To satisfy all these conditions, let's dedicate two axes to electric fields, and the third axis to a magnetic field. At human scales, we induce a magnetic field with an electromagnet, where electric current circulates in a wire coil. Our two electric field axes decompose a circle into two, orthogonal, synchronous, sinusoidal waves 90° out of phase, where plus and minus electric charges manifest clockwise and counterclockwise rotation. Like an electromagnet, our two dimensional, electric field circle generates a static magnetic dipole known as a charged particle's magnetic moment. An electron has a stronger magnetic moment than a proton, which suggests higher frequency electric waves. However, a proton has greater gravitic mass. At extreme scales of gravitic mass, light cannot escape a black hole and passage of time slows. Therefore, gravitic mass is the prime suspect for lower electric wave frequencies that generate weaker magnetic moments for protons than electrons. Gravitic mass remains the greatest challenge for a force field recipe.

Einstein established mass-energy equivalence with his famous equation: energy equals mass times the speed of light squared, $E = mc^2$. In a particle collider electromagnets accelerate charged particles to high velocities on intersecting paths. In head on collisions, pair production converts kinetic energy into particles and antiparticles, many of which exhibit opposite electric charges. In a mathematical sense, $(+1) + (-1) = 0$. In pair production, kinetic energy binds into potential energy in an odd but predictable way to generate particle antiparticle pairs that can annihilate each other to liberate energy, as potential energy converts back into kinetic energy. This liberated energy can convert back into the same type of particle antiparticle pair, or subdivide into other types of particle antiparticle pairs of lesser energies, or directly convert into photon pairs of equivalent energy where mass is not preserved.

Hard to imagine, but particle antiparticle annihilations can fail to conserve mass and produce massless photons. However, if gravitic mass is just potential energy then mass vanishes when potential energy converts back into kinetic energy consistent with mass-energy equivalence. To imagine how kinetic energy binds into potential energy, one possible analogy is to consider hurricanes and cyclones. A right-handed hurricane is a counterclockwise wind flow pattern in Earth's Northern Hemisphere, and a left-handed cyclone is a clockwise wind flow pattern in Earth's Southern Hemisphere, where the Coriolis force causes opposite rotations. If we combine a hurricane and a cyclone of equal magnitudes then the atmospheric molecules collide and cancel opposite wind velocities, but collision energies remain. Likewise, potential energy vanishes when particle antiparticle pairs annihilate, but kinetic energy remains. Gravitic mass is an emergent property of subatomic particles that coincides with potential energy at every scale.

An electron and a proton possess opposite electric charges, which can combine into a neutron. However, a neutron contains more mass from an electron neutrino. Like a neutron, a neutrino exhibits no net electric charge. We don't know whether gravitic mass can exist independent of electric and magnetic fields. However, the decay of a neutron into its constituent parts suggests

codependency, since the electron neutrino attaches more firmly to an electron than to the greater mass proton. Let's extend the electron-proton recipe to produce an electron neutrino recipe, where two magnetic field axes and one electric field axis produce an electric dipole that appears as a neutral electric charge at a distance like a neutron. An analogy for opposite electric charges is handedness. One electric charge is left-handed and the other is right-handed, where thumbs point in the direction of magnetic North. If we point our thumbs from both hands in the same direction, then our fingers curl in opposite directions. Our electron neutrino recipe permits us to attach an electron and a proton together with a magnetic monopole, electric dipole neutrino so the thumbs of both hands point together and our fingers curl in the same direction, which explains the necessity for an electron neutrino within a neutron. A neutron magnetic moment is weaker than either an electron or a proton, which is consistent with opposed electron and proton magnetic moments.

A neutron is stable inside atoms, but quickly decays outside atoms. Why? Consider the rotating mass of a gyroscope. If no external force is applied, then a gyroscope maintains the orientation of its rotational axis. However, the axis of a gyroscope will precess in a direction perpendicular to an applied force. A neutron is shielded inside an atom, but outside an atom a neutron is subject to external forces, which cause the proton, electron neutrino, and electron to precess independent of one another and to break apart. The electron neutrino attaches longer to the electron with a stronger magnetic moment, since electric charges are equal strength for electrons and protons. However, experiments clock the speed of neutrinos at or near the speed of light, which suggests matter and antimatter gravitic masses are potential energy vortexes that rotate in opposite directions, where likes attract but opposites repel. If true, then the big bang theory is a fallacy too (*4*). Quantum mechanics will have none of this local reality common sense. At first Einstein was complicit with quantum mechanics, but later he became an outspoken critic.

EPR paradox. Under normal circumstances it is impossible to simultaneously measure two or more properties of a subatomic particle without disturbing the particle. However, Einstein, Podolsky, and Rosen proposed a thought experiment, know by the author's initials, that measures exactly two properties by exploiting the unique properties of pair production. Since pair production generates a particle and an antiparticle with opposite rotations and equal magnitudes, each of the pair can be measured for independent properties and the combined information reconciled without contradiction.

Bell's inequality. In response to the EPR paradox, Bell's inequality is a specious proof of quantum mechanics intended to test whether a particle antiparticle pair communicate with each other. However, Bell's inequality derives from a false premise, which was exposed by Joy Christian (*5-11*). Bell falsely assumed two dimensional particles. At human scales, a two dimensional analogy is detecting a coin passing through a slot. When a coin is nearly aligned with the slot it passes through most of the time, but not when perpendicular to the slot. Bell misconstrued probability of particle detection for a mathematical correlation between the relative angles of alignment between the slot and any given coin. A three dimensional analogy is a gyroscope. If a gyroscope is aligned with a detector then it will trigger the detector. However, if a gyroscope is not aligned with a detector then the gyroscope will precess in a direction perpendicular to the applied force, after which it may or may not trigger the detector. Precession adds another degree of freedom and complexity that the coin analogy lacks. Do subatomic particles act more like our two or our three dimensional analogies? Magnetic Resonance Imaging (MRI) employs a strong magnetic field and radio frequency (RF) signal to detect the precession

of water molecule hydrogen atoms, i.e. protons. Therefore, particles act like three dimensional gyroscopes and Bell's inequality is a fallacy. How could theories of physics evolve so far along a path headed for extinction? Ask the Vatican to justify its objection to the heliocentric model. Human nature is what it is, and it hasn't changed all that much.

Mere intelligence, sheer genius. Extraterrestrials should encounter no difficulty finding intelligent life on planet Earth, but why bother? Intelligence is nothing to write home about. Intelligence tests place high value on the recognition of cultural patterns, which are correlations. Penrose associates human intelligence with quantum probabilities in the brain (*12*). However, neural network correlations are probabilistic anyway. Red is a normal distribution curve in color space. Lighten red to pink, darken red to brown, add blue to magenta, and add yellow to orange, but borders between colors are indistinct. Correlations are contextual and ambiguous around the edges. Correlations deal in similarities, the fodder of stereotypes and prejudice. Don't get me wrong. Correlations are useful. We learn language from experience, repetition, and correlations, but the English language is neither true nor false. It is far easier to discover what is true or false from an outsider's perspective. That is the beauty of the scientific method.

The scientific method determines facts, not theories, starting with a hypothesis gained from insight. If facts contradict a hypothesis, then the hypothesis is false and the insight is incorrect. However, facts can never prove a hypothesis true or an insight correct. Some other explanation is always possible. As long as lax scientific standards sanction theories, then the demarcation between science and pseudoscience remains indefensible. Mathematics suffers no demarcation problem. Mathematicians practice the recipe method. With the recipe method, if we get Mother Nature's principles and rules correct then whatever logically follows must be factual and pass a reality check. In the natural sciences, evidence accumulates with experience and experiments. Why are old theories derived from fewer facts so hard to abandon? Most computer programmers, me included, would rather start over from scratch than debug an outdated program that never worked. Is the cultural divide that wide between computer programmers and scientists?

Truth transcends context. Mathematics is a useful analogy to describe natural phenomena, but a reality check is essential. The ancients attributed weather phenomena to gods, and tried to correlate weather with their own actions, in stimulus and response fashion. A favorable response renders a stimulus correlation, the same basis for learning superstitions as for learning language. Scientific minded people no longer believe in superstitions, but science hasn't abandoned inductive speculation. I believe it is safe to say that nobody in the entire history of mankind has ever discovered the truth about atomic or cosmic reality before me. The prime reason is that intelligence relies on correlations, not causation. By definition, correlation is thinking inside the box. Thinking outside the box demands causation since untried causes are blind to their effects until after the fact, which no box can contain.

Causation respects the big picture in ways that correlation does not. The scientific method discovered ozone depletion in the upper atmosphere. The cause was chlorofluorocarbons that chemical companies produced as a refrigerant and aerosol. Now, we correlate abnormal weather phenomena with greenhouse gases produced by human behavior. Ancient rituals aside, context really matters. Changing the chemical composition of Earth's atmosphere is just cause for abnormal weather phenomena. When most weather simulations predicted otherwise, one predicted far in advance that hurricane Sandy would make landfall near New York harbor. Reality check, Sandy devastated the whole region. Computer simulations are recipes with ingredient inputs and cooked outputs. A reality check determines whether a recipe is an accurate

analogy of reality. Analogies transcend contexts. Theories and recipes are both analogies that must pass reality checks.

Common sense is fundamental to analogies. Quantum mechanics abandoned common sense for faith in mathematical analogies. However, falsification demands common sense. Otherwise we'd still be performing rituals to appease the weather gods. It is far easier to discredit correlations from the vantage point of a successful recipe. The trick is to discover the principles, the rules, and the initial conditions that govern an emergent recipe. In the mainstream, it takes intense devotion and unquestioning loyalty to take a false premise, stick with it, and follow its path to its logical conclusion, which was a predestined dead end that few or none suspected up front. However, it takes courage to abandon mainstream beliefs, insight to follow promising paths to their logical conclusions, persistence to follow fresh leads to their logical conclusions, nerve to question authority in light of new evidence, gumption to discard unsavory recipes, serendipity to discover savory recipes, and retrospection to diagnose gastronomic genius. Unfortunately, nobody encourages us, as we venture out into the unknown wilderness. On our own, guided by a gourmet palate, perhaps misguided by blind faith, after we return to announce our secret discovery that defied every conceivable means of prediction, nobody believes us when our secret discovery contradicts popular theories and challenges vested interests. Thanks for nothing. Familiarity breeds contempt for the unfamiliar.

Axiom atom. I offer no proof, but formally announce my discovery of a local reality atomic model, where molecular structure naturally emerges from atomic structure, and which explains anomalies in the periodic table, along with other emergent behavior that passes reality checks. My Axiom Atom model exists as an extensive document with images and animation produced by my own computer simulations developed over the course of three years. A pioneer in computer graphics, I hid Mickey Mouse in the feature film TRON (*13-15*). No question I possess the necessary qualifications. According to my Axiom Atom model a levitating cannonball is feasible, since electron-proton disparity comes standard. However, my reason for withholding specific details concerns commonly held economic fallacies. In principle, I support free and open sharing of scientific knowledge, but not in theory, which is a riddle that begs explanation. I consulted Richard Stallman, founder of the free software movement, as I investigated how to keep the Axiom Atom model and all its derivatives free from exclusive private ownership. Stallman's contribution to society is that his legally binding free software licenses require that all future extensions to free software also remain free, along with free access to the entire source code. However, principles are not protected by law. Under current economic systems, if the Axiom Atom principles ever enter the public domain, then writing a proprietary software version is straightforward, and extensions to that proprietary software no longer remain free knowledge. Furthermore, products developed with any version of Axiom Atom software, free or proprietary, are then open to patenting, which places whole branches of knowledge in jeopardy of exclusive private ownership with restricted access. That's good for the greed culture of corporate capitalism, but bad for the gift culture of free knowledge, and crippling in the long run for the public interest.

Full and open disclosure is naïve, boxed in thinking. Freely shared knowledge is a core principle of science. However, the concept of free knowledge observed by many scientists is a fallacy. Capitalist corporations love free stuff. Capitalist corporations exploit free information to gain private ownership of proprietary information and proprietary products, which inhibits the future sharing of knowledge. Like science itself, the Axiom Atom model is an extensible recipe not a

theory. Without principles and rules that guarantee all future extensions to free knowledge also remain free then exploitation leads to exclusive private ownership through non disclosure agreements, proprietary information, copyright and patent restrictions backed by legal means intended to protect against economic competition. However, this course of feudal economics undermines the free exchange and extension of free knowledge, which are in the public interest and a core principle of science. Higher principles of free scientific inquiry are at stake here, which are traditionally surrendered to economic special interests. President Clinton ruled that human genes are not patentable despite the fact that a privately held company aided the human genome project. Investors were blindsided, but free knowledge prevailed. However, genes are currently considered patentable products, while principles are not. Science is a meritocracy subject to an economic plutocracy. No compromise between a gift culture and a greed culture ends well for the gift culture as the American Indians can attest. It's primetime for a declaration of independence.

New world order. Leaping leptons, Batman. A crisis of faith, black swan event in theoretical physics is the least of our worries. Many scientists feel compelled to sell exclusive rights of scientific research to proprietary interests. If I auction my Axiom Atom model off to the highest bidder, then I'd either become wealthy or hold out for a better offer, but the whole world suffers either way, but both options are superior to the aftermath of public disclosure. Feudal economics is incompatible with free knowledge and world peace. Corporate capitalism and socialism are both relics of feudalism, with different masters. It took the Soviet Union seventy years to discover, what programmers proved in half the time, that large scale central planning is a fiasco. Computer programming has evolved so fast that its entire history transpired within a single lifetime. Mine included. The lesson of computer programming is that human networks must supplant human hierarchies. Top down control is a recipe for disaster. We must globalize information and distribute production down to the lowest level possible: sustainable local, regional, or virtual communities of cooperative enterprises not capitalist corporations. The year 2012 is the international year of cooperatives. Cooperative enterprises are democratic networks (*16*). Capitalist corporations and central governments are feudal hierarchies.

Consider landlords. Landlord is a feudal title. A homeowner makes payments on a mortgage loan and earns equity as principle paid. A homeowner can install energy saving devices and make improvements that reduce expenses and increase equity. However, the landlord earns all the equity when a tenant pays rent to the landlord who forwards the rent payments to the mortgage loan holder. A business earns no equity in the building where it leases space either, because landlords are a relic of Feudalism. Furthermore, a landlord has no incentive to make capital improvements to a tenant's property, which is called an externality in feudal economics – a liability that a business does not need to pay, like pollution and its related health care costs. Since tenants never own any equity, landlords ignore tenant incentives. A landlord makes no investment without personal gain even though the savings to tenants and the environment might be substantial.

The recipe remedy is to abandon feudal economics in general and landlords in particular. To implement equitable recipes takes an informed public, a self-organized uprising by tenants, demand side activism to correct the priorities and policies of mortgage lenders, and universal bookkeeping methods to account for equity shares of property owned – based on principle paid by tenants, rather than equity usurped by landlords. Thereafter, business and renter tenants earn equity that can be sold to another party or transferred to other property. The means are feudal

economic heresy, but the ends reduce poverty and solidify a middle class and small businesses, much more equitable outcomes than prolonging the disparity and injustice of feudal economics or protecting landlord privileges. Credit unions are cooperatives that should adopt this policy to foster tenant cooperatives and refuse loans to landlords on cooperative principles. If you are interested then move all your savings into your community credit union and tell a loan officer that you want to form or join a tenant cooperative to purchase rental housing. Why hasn't anyone questioned the legitimacy of landlord tenant economic relationships to this extent before? Thinking outside the box is as easy as child's play using the recipe method, whereas theories prolong intellectual constipation.

Free market capitalism is a misnomer. Feudal market capitalism is the reality. It's supply and demand economics, not demand and supply economics. For all the hype about competition, a lot of cooperation goes into avoiding options that favor consumers. Theories are great at perpetuating the same old patterns. However, the solutions to what ails society are to be found in recipes, prescriptions, and remedies, not theories. Einstein wrote, "A new type of thinking is essential if mankind is to survive and move toward higher levels." Scientists can lead the way by scrutinizing theoretical speculation in greater detail. Analogies transcend contexts. Consider brokers. A broker earns transaction fees, whether or not an investment makes money. Whereas a lawyer earns a commission only if a client wins a settlement. By comparing and contrasting similar theories we can peek outside the box. A commission as a percentage of investment gains is a game changer that old school brokers are unlikely to adopt, but a young upstart might seize the opportunity and put all her competitors to shame. An enterprising young scientist might do the same process to compare and contrast similar scientific theories.

Peer review science is a hierarchy not a democracy. Editors at peer review journals are the keepers of the faith; faith in scientific theories. A shorter version of this document, edited for length, was submitted and rejected by an editor of Science Magazine. Another work of mine on cellular cosmology, that refutes the big bang theory, was submitted and rejected by an editor at the Physical Review Letters. Both of my submissions were recipes, based on deductive reason, not theories, based on inductive speculation. However, if a submission like mine were to discredit an entire theoretical basis of faith, then the value of the content at these scientific journals would be reduced to nothing. Editors, and peer reviewers are keepers of the faith, supported by skeptical inquisition laymen. The just demarcation between science and pseudoscience is the demarcation between deductive reason, and inductive speculation, between recipes and theories.

I urge voters to support the following recipe prescriptions. Only elect politicians to federal office who pledge to abolish corporate personhood and pledge to divest centralized political control down to the community level. Civic associations offer a viable recipe to network at higher levels of organization, without establishing hierarchical power structures. Patent and copyright reform must limit ownership to a person or persons who submit the original patent or copyright, and not recognize transfer to anyone else, which rules out corporate or institutional ownership. I propose the following reforms for the funding of scientific research and recipe science. Globalize information into virtual community, cooperative guilds with open access for all non economic purposes. Restrict economic purposes to local or regional cooperative enterprises that pay a percentage of net profits for the information and recipes used to produce products and services. Do unto others… Deny access to capitalist corporations that employ non disclosure agreements and proprietary information, and pass draconian laws to punish violations. Grant access to

capitalist corporations that comply with gift culture requirements. However, encourage, but do not force, all capitalist corporations to evolve into cooperative enterprises. Educate consumers on the differences between democratic, networking cooperative enterprises and feudal, hierarchical capitalist corporations and then let free market consumerism decide the fate of the world. The term I propose for the organization of cooperative guilds is Global Information Foundation Trust (GIFT). Futurist Alvin Toffler proposed three necessary and sufficient conditions to effect change in big organizations: internal pressure from dissatisfaction, external pressure from competition, and "a coherent alternative embodied in a plan, a model, or a vision" (17).

How long will it take to implement these recipe prescriptions? I don't know. That depends on you. Near term prospects are discouraging. Organized religion preaches the coming of a messiah, savior, or deliverer, which fosters a passive wait-and-see attitude. Never confuse the messenger for the message. Authority has two aspects: mastery over people and mastery of knowledge. Mastery of knowledge can be shared network fashion. Mastery over people is hierarchical, with power sharing only at the top. Moses did not wander the Sinai for forty year because he was lost. Captivity in Egypt indoctrinated a slave mentality into the Exodus generation, and a new generation needed to grow up free to learn how to compete in an adversarial world. Max Planck echoed this sentiment, "A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it." Every straight A student learns that it is harder to get ahead than it is to stay ahead. Machiavelli cautioned the instigator of a new world order that hardliners will attack without mercy, while those destined to benefit will hold back support for a sure sign of success, early adopters will get discouraged, and that force is inevitable for success (18). Italians were a kick ass Theory X society; but Theory Y people are eager for the opportunity to exercise their own initiative. Through peaceful means, post modern culture must evolve in a healthy direction and leave all relics of Feudalism behind. The age of empires is in decline. The age of emergence is dawning. Goodbye Social Darwinism. Hello social networking.

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Supplementary Materials:

Spreadsheet for Figure 1. Atomic Element versus Phase Transition Temperature. The last three columns are temperature in degrees Kelvin, which appear in the figure where the vertical axis is a log scale. For the last column, ionization energy in electron volts is divided by the Boltzmann constant (k_B) to equal temperature in degrees Kelvin. The first five columns are taken from the website listed in reference (*19*).

No.	Name	M.P.(°C)	B.P. (°C)	Ionization energy (eV)	Melting	Boiling	Ionizing
1	Hydrogen	-259	-253	13.5984	14	20	157802.7008
2	Helium	-272	-269	24.5874	1	4	285324.6062
3	Lithium	180	1347	5.3917	453	1620	62568.00961
4	Beryllium	1278	2970	9.3227	1551	3243	108185.3188
5	Boron	2300	2550	8.298	2573	2823	96294.18249
6	Carbon	3500	4827	11.2603	3773	5100	130670.2077
7	Nitrogen	-210	-196	14.5341	63	77	168661.0361
8	Oxygen	-218	-183	13.6181	55	90	158031.3095

9	Fluorine	-220	-188	17.4228	53	85	202182.9697
10	Neon	-249	-246	21.5645	24	27	250245.3481
11	Sodium	98	883	5.1391	371	1156	59636.71165
12	Magnesium	639	1090	7.6462	912	1363	88730.36613
13	Aluminum	660	2467	5.9858	933	2740	69462.24603
14	Silicon	1410	2355	8.1517	1683	2628	94596.44341
15	Phosphorus	44	280	10.4867	317	553	121692.9626
16	Sulfur	113	445	10.36	386	718	120222.6718
17	Chlorine	-101	-35	12.9676	172	238	150482.579
18	Argon	-189	-186	15.7596	84	87	182882.357
19	Potassium	64	774	4.3407	337	1047	50371.67485
20	Calcium	839	1484	6.1132	1112	1757	70940.65997
21	Scandium	1539	2832	6.5615	1812	3105	76142.95956
22	Titanium	1660	3287	6.8281	1933	3560	79236.72059
23	Vanadium	1890	3380	6.7462	2163	3653	78286.31163
24	Chromium	1857	2672	6.7665	2130	2945	78521.88308
25	Manganese	1245	1962	7.434	1518	2235	86267.89017
26	Iron	1535	2750	7.9024	1808	3023	91703.44031
27	Cobalt	1495	2870	7.881	1768	3143	91455.10391
28	Nickel	1453	2732	7.6398	1726	3005	88656.0973
29	Copper	1083	2567	7.7264	1356	2840	89661.04743
30	Zinc	420	907	9.3942	693	1180	109015.0409
31	Gallium	30	2403	5.9993	303	2676	69618.90685
32	Germanium	937	2830	7.8994	1210	3103	91668.6268
33	Arsenic	81	613	9.7886	354	886	113591.8576
34	Selenium	217	685	9.7524	490	958	113171.7746
35	Bromine	-7	59	11.8138	266	332	137093.3012
36	Krypton	-157	-153	13.9996	116	120	162458.4282
37	Rubidium	39	688	4.1771	312	961	48473.17784
38	Strontium	769	1384	5.6949	1042	1657	66086.49552
39	Yttrium	1523	3337	6.2173	1796	3610	72148.68894
40	Zirconium	1852	4377	6.6339	2125	4650	76983.12572
41	Niobium	2468	4927	6.7589	2741	5200	78433.68884
42	Molybdenum	2617	4612	7.0924	2890	4885	82303.79126
43	Technetium	2200	4877	7.28	2473	5150	84480.7964
44	Ruthenium	2250	3900	7.3605	2523	4173	85414.95905
45	Rhodium	1966	3727	7.4589	2239	4000	86556.84234
46	Palladium	1552	2927	8.3369	1825	3200	96745.59773
47	Silver	962	2212	7.5762	1235	2485	87918.05078
48	Cadmium	321	765	8.9938	594	1038	104368.5971
49	Indium	157	2000	5.7864	430	2273	67148.30773
50	Tin	232	2270	7.3439	505	2543	85222.32427
51	Antimony	630	1750	8.6084	903	2023	99896.22084
52	Tellurium	449	990	9.0096	722	1263	104551.9482
53	Iodine	114	184	10.4513	387	457	121282.1631
54	Xenon	-112	-108	12.1298	161	165	140760.3247
55	Cesium	29	678	3.8939	302	951	45186.78202
56	Barium	725	1140	5.2117	998	1413	60479.19871

57	Lanthanum	920	3469	5.5769	1193	3742	64717.16393
58	Cerium	795	3257	5.5387	1068	3530	64273.87184
59	Praseodymium	935	3127	5.473	1208	3400	63511.45587
60	Neodymium	1010	3127	5.525	1283	3400	64114.89013
61	Promethium	1100	3000	5.582	1373	3273	64776.34691
62	Samarium	1072	1900	5.6437	1345	2173	65492.34487
63	Europium	822	1597	5.6704	1095	1870	65802.18515
64	Gadolinium	1311	3233	6.1501	1584	3506	71368.8662
65	Terbium	1360	3041	5.8638	1633	3314	68046.49642
66	Dysprosium	1412	2562	5.9389	1685	2835	68917.99474
67	Holmium	1470	2720	6.0215	1743	2993	69876.52686
68	Erbium	1522	2510	6.1077	1795	2783	70876.83519
69	Thulium	1545	1727	6.1843	1818	2000	71765.74027
70	Ytterbium	824	1466	6.2542	1097	1739	72576.89517
71	Lutetium	1656	3315	5.4259	1929	3588	62964.88368
72	Hafnium	2150	5400	6.8251	2423	5673	79201.90708
73	Tantalum	2996	5425	7.5496	3269	5698	87609.37095
74	Tungsten	3410	5660	7.864	3683	5933	91257.82732
75	Rhenium	3180	5627	7.8335	3453	5900	90903.88992
76	Osmium	3045	5027	8.4382	3318	5300	97921.13409
77	Iridium	2410	4527	8.967	2683	4800	104057.5963
78	Platinum	1772	3827	8.9587	2045	4100	103961.2789
79	Gold	1064	2807	9.2255	1337	3080	107057.3609
80	Mercury	-39	357	10.4375	234	630	121122.0209
81	Thallium	303	1457	6.1082	576	1730	70882.63744
82	Lead	327	1740	7.4167	600	2013	86067.13223
83	Bismuth	271	1560	7.2856	544	1833	84545.78163
84	Polonium	254	962	8.417	527	1235	97675.11859
85	Astatine	302	337	9.3	575	610	107921.8965
86	Radon	-71	-62	10.7485	202	211	124731.022
87	Francium	27	677	4.0727	300	950	47261.66751
88	Radium	700	1737	5.2784	973	2010	61253.21919
89	Actinium	1050	3200	5.17	1323	3473	59995.29085
90	Thorium	1750	4790	6.3067	2023	5063	73186.13168
91	Protactinium	1568		5.89	1841		68350.53445
92	Uranium	1132	3818	6.1941	1405	4091	71879.46442
93	Neptunium	640	3902	6.2657	913	4175	72710.34698
94	Plutonium	640	3235	6.0262	913	3508	69931.06803
95	Americium	994	2607	5.9738	1267	2880	69322.99197
96	Curium	1340		5.9915	1613		69528.39171
97	Berkelium	986		6.1979	1259		71923.56154
98	Californium	900		6.2817	1173		72896.01906
99	Einsteinium	860		6.42	1133		74500.9221
100	Fermium	1527		6.5	1800		75429.2825
101	Mendelevium			6.58			76357.6429
102	Nobelium	827		6.65	1100		77169.95825
103	Lawrencium	1627		4.9	1900		56862.0745
104	Rutherfordium						

105	Dubnium						
106	Seaborgium						
107	Bohrium						
108	Hassium						
109	Meitnerium						