

Title –

TAMARA SCIENCE

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Abstract –

These are the thoughts that popped into my head while reading a certain article. The paragraphs are copied and pasted – sometimes with important or merely minor alterations – from my writings since 2009 (paperbacks I've written, my contributions at ResearchGate, articles I've written for vixra.org or saved on my computer). The article that inspired me to write "Tamara Science" is "Is the Universe Leaking Energy?" by Tamara M. Davis, a Ph.D. at the University of Queensland's School of Mathematics and Physics (in Brisbane, Australia).

Topics addressed in this article (in concentrated, nontechnical form) are –

Is the Universe Leaking Energy?;

Unifying Gravity With the Other Forces (Includes Photon & Graviton Mass);

Digital String Theory;

Poincare + Cosmic Strings, Wormholes and Hologram;

Steady State Universe, Big Bang Subuniverses and DNA's Double Helix;

Newtonian / Einsteinian Space-Time Warping;

Cosmic Rays, Ultra-High-Energy Cosmic Rays & Today's Speed of Light;

Electronic Infinity;

Interstellar and Intergalactic Travel;

c^2 and the Atomic Nucleus (continuing 1st paragraph's shorthand);

Dark Energy and Fractal Geometry;

5th-dimensional Hyperspace and Time Travel to Past and Future;

Dark Matter;

Neil Armstrong in Perpetual Motion;

Law of Conservation, Origin of Life, and Humanity-God Partnership;

Star Trek replicator & transporter, Earth as Paradise + Money Free Zone That Colonizes Cosmos, Geocentric Cosmos (not physically);

Band-Gap Implants in the Brain;

Cosmic Expansion, Accelerating Expansion, and Deleted Expansion;

Variable Speed of Light;

Springy Rubber Balloon of G and EM;

Billions of Years in the Past, Trillions of Millennia in the Future.

Content –

Is the Universe Leaking Energy?

That question reminds me of physicists saying gravity is so weak because it leaks out of space-time's 4 dimensions, and into other dimensions. I don't think it does (though I still believe in a 5th-dimensional hyperspace - more about that soon). **I think gravity is so weak because it loses 10^{24} of its energy during the formation of matter/mass (that's my shorthand way of saying it starts with a frequency 10^{25} times that expected but loses a trillion trillion parts of that energy).** Suppose Albert Einstein was correct when he said gravitation plays a role in the constitution of elementary particles^[0] (in "Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of Matter?", a 1919 submission to the Prussian Academy of Sciences). And suppose he was also correct when he said gravitation is the warping of space-time. Then it is logical that 1) gravitation would play a role not only in elementary particles and their masses but also in the constitution of the forces associated with those particles i.e. the nuclear strong force and the electroweak force (combination of electromagnetism and the weak nuclear force)[^], and 2) the warping of space-time that produces gravity means space-time itself plays a role in the constitution of elementary particles, their masses, and in the forces. Therefore, time is unified with the gravitational and electromagnetic fields (overcoming the 50-year-old objection to Einstein's Unified Field Theory which was put forth by England's Professor Penrose).

[0] Space within the galaxy is not expanding because it and its particles are bound by forces. Anatolij Prykarpatski from the AGH University of Science and Technology in Kraków, Poland (Faculty of Applied Mathematics)

^ The experiments of Italian physicist Galileo led to our belief that all objects fall towards Earth's centre at 9.8 metres (32 feet) per second per second. What if Albert Einstein was correct when he said gravitation plays a role in the constitution of elementary particles (in "Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of Matter?", a 1919 submission to the Prussian Academy of Sciences). According to legend, Galileo dropped a 10-pound ball and a 1 pound ball from the Leaning Tower of Pisa. They hit the ground at the same time - this is explained by Albert Einstein's idea that gravity is the curvature of space-time and acts on every object in the same way. But if Einstein is correct about gravity playing a part in forming particles, gravity would have a slightly larger effect on the 10 lb. ball than on the 1 lb. ball. The fact that they hit the ground simultaneously shows that gravity's effect on different weights is so tiny that modern science cannot measure it (maybe science will be able to measure it in decades to come). So the heavier weight does fall faster than the lighter weight as the ancient Greek philosopher Aristotle believed, and Einstein himself discovered that his theory of General Relativity requires modification.

^ Speaking of Relativity and the speed of light, we should remember that $E=mc^2$ appears to only be partly correct because the highest speed possible is Lightspeed.[!] Physically speaking, it cannot be multiplied. Einstein himself proved this. The equation $E=mc^2$ can be considered a degenerate form of the mass-energy-momentum relation for vanishing momentum. Einstein was very well aware of this, and in later papers repetitively stressed that his mass-energy equation is strictly limited to observers co-moving with the object under study (I think he was referring to the time in the 1890s when he was imagining what it would be like to move along beside a beam of light). The version of the equation applicable in most situations (converting mass to energy in explosion of an atomic bomb is an unusual situation) may be $E=m/c^2*c^2$. For example, dividing then multiplying by c^2 cancel each other, leaving $E=m$. Astronomically, this means (gravitational) ENERGY produces (a star's) MASS which then produces (all the wavelengths of electromagnetic) ENERGY, and $E=m=E$.

[!] It's impossible to point to the 4th dimension of time, so this cannot be physical. Since the union of space-time is well established in modern science, we can assume the 4th dimension is actually measurement of the motions of the particles occurring in the 3 dimensions of length, width, and height. The basic standard of time in the universe is the measurement of the motions of photons - specifically, of the speed of light. This is comparable to the 1960's adoption on Earth of the measurement of time as the vibration rate of cesium atoms. At lightspeed, two things happen - matter gets transformed into energy (carrier particles, like photons and gravitons, are mathematical - more about this below), and time = 0 (it is stopped). Below 300,000 km/sec, acceleration or gravitation causes time dilation (slowing of time as the speed of light is approached). If time's 0, space is also 0 because space and time coexist as space-time whose warping (gravity) is necessarily 0 too. Spacetime/gravity form matter/mass, so

the latter pair can't exist at lightspeed and photons are massless[!!] at that velocity. Gravitons are also massless at Lightspeed since electromagnetism and gravitation are both disturbances in unified space-time.

[!!] When gravitons and photons transfer energy to each other, $E=mc^2$ ("Does the Inertia of a Body Depend Upon Its Energy Content?" by Albert Einstein - "Annalen der Physik" - November 21, 1905) says the relation of mass to energy means they're transferring mass, too. Another way to view their interaction is – the product of gravity interacting with electromagnetism is what we call "mass"; the gravitons and photons therefore give mass to each other. Experiments conducted by the Particle Data Group ("Review of Particle Physics" - Physics Letters B, Volume 667, Issues 1–5, 11 September 2008, Pages 1–6) say the mass of a single photon is no more than $10^{-18} \text{ eV}/c^2$.

"Mass of the graviton" by Alfred S. Goldhaber and Michael Martin Nieto - Phys. Rev. D 9, 1119–1121 (1974) - says "...although it is not known if the graviton exists, one can still say that its rest mass is less than $2 \times 10^{-62} \text{ g}$. It's important to note that this paragraph is referring to either subluminal or rest mass of the photon. In other articles e.g. "Equation Describing the Universe" (<http://vixra.org/abs/1305.0030>), I refer to photons as massless. This is their state at the speed of light.

^ Referring back to the 2nd paragraph of this section, $E=mE$ confirms Einstein's idea of gravitation forming particles as well as his belief that gravity and electromagnetism are related.

^ Second, the electromagnetic force (and how it's united with gravitation by having a common mathematical cause, which I call **Digital String Theory**) –

^ Let's borrow a few ideas from string theory's ideas of everything being ultimately composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents in a four-dimensional looped superstring ("Workings of the Universe" by Time-Life Books – 1991, p.84). We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) forming currents in a two-dimensional program called a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current. Combination of the 2 loops' currents requires connection of the two as a four-dimensional Klein bottle. This connection can be made with the infinitely-long irrational and transcendental numbers. Such an infinite connection translates - via bosons being ultimately composed of the binary digits of 1 and 0 depicting π , e , $\sqrt{2}$ etc.; and fermions being given mass by bosons interacting in matter particles' "wave packets" – into an infinite number of (possibly Figure-8) Klein bottles###. Slight imperfections in the way the Mobius loops fit together determine the precise nature of the binary-digit currents (the producers of space-time-hyperspace, gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force) and thus of exact mass, charge, quantum spin. They would also produce black holes - whose binary digits could, in the case of the sun, come from our star being compressed to 2.95 kms, in which case the pressure increase "shreds" the sun into its

binary digits (its mass is relativistically converted into the energy of binary digits). Referring to a Bose-Einstein condensate, the slightest change in the binary-digit flow (Möbius loop orientation) would alter the way gravitation and electromagnetism interact, and the BEC could become a gas (experiments confirm that it does).

Poincaré + Cosmic Strings, Wormholes and Hologram

Discovery.com (March 18, 2010) says: "The universe is not only expanding -- it's being swept along in the direction of constellations Centaurus and Hydra at a steady clip of one million miles per hour, pulled, perhaps, by the gravity of another universe." (this is called "the dark flow") Could this be describing evidence of an idea suggested by mathematics' "Poincaré conjecture", which has implications for the universe's shape and says you cannot transform a doughnut shape into a sphere without ripping it. This can be viewed as subuniverses[1] shaped like Figure-8 Klein Bottles (similar to doughnuts) gaining rips called wormholes when extended into the spherical spacetime that goes on forever (forming one infinite superuniverse). Picture spacetime existing on the surface of this doughnut### which has rips in it. These rips loop from, and back to, spacetime; providing shortcuts between points in space and time – and belong in a 5th-dimensional hyperspace. A journey along these loops might, at first, appear to take longer – but remember, that trip doesn't take place in space or time.

^ Is the boundary where subuniverses meet could be called a Cosmic String? Analogous to cracks that form when water freezes into ice, cosmic strings were first contemplated by the theoretical physicist Tom Kibble in the 1970s. They are "cracks" in spacetime formed as subuniverses cool from their respective Big Bangs, are extremely thin (the diameter of a proton, or smaller), and have immense density (10^{19} kg/cm, according to Penguin Encyclopedia, Edited by David Crystal – Penguin Reference Library 2006). This density would vary between any two subuniverses since it depends on the mass and energy content of the boundary regions of the two subuniverses added together, as well as movement of their boundary (the cosmic string) caused by expansion of the subuniverses – because the relativistic motion of a boundary converts a lot of energy and mass.

^ Or are the cracks in the universe called cosmic strings merely another name for the rips in the universe called cosmic wormholes?

British quantum physicist David Bohm (1917-1992) said "Our brains mathematically construct objective reality by interpreting frequencies that are ultimately projections from another dimension, a deeper order of existence that is beyond both space and time." (<http://www.spaceandmotion.com/Physics-David-Bohm-Holographic-Universe.htm>) In "The Hidden Reality" - Knopf (January 25, 2011), Brian Greene writes "... reality ... may take place on a distant boundary surface, while everything we witness in the three common spatial dimensions is a projection of that faraway unfolding. Reality, that is, may be akin to a hologram.

Or, really, a holographic movie.” Brian Greene’s “...projection of that faraway ... reality that is ... akin to a holographic movie” and David Bohm’s “...projections from another dimension ... that is beyond both space and time” could be interpreted as projections of binary digits from a 5th-dimensional hyperspace which become matter, energy, force and space-time in the known 4 dimensions. How could “space-time itself play a role in the constitution of elementary particles, their mass, and the nuclear forces”? Because gravitation and electromagnetism interact to form particles, and gravitation is the warping of space-time while electromagnetism is not separate from space-time but is waves in it. Binary digits in hyperspace control the space-time that produces particles, much as binary digits in a computer control the motors that produce work. The work contains both the computer and motors (without either of these, no work is done). Similarly, all particles contain both space-time and hyperspace. (In a universe described by fractal geometry, the 5th dimension wouldn't exist only on a cosmic scale but also as a hyperspace in every fermion and boson.) Mobius loops are the foundation of particles. The 3 familiar dimensions of length, width and height along, for example, the left side of a Mobius loop – for convenience, the relative positions of the 2 Mobius loops previously referred to can be thought of as the orientation of a single loop - would have a 4th dimension (time) perpendicular to them. And there would also exist a 5th dimension called hyperspace, at right angles to the 4th and 180 degrees from the length/width/height i.e. on the right. H-space is extended from the side along the loop's bottom – and even “invades” the spatial and temporal dimensions which it produces - because the WMAP space probe (Wilkinson Microwave Anisotropy Probe) and Planck space probe have determined that a very large 70% of the universe is dark energy ... and **transmissions of binary digits from hyperspace (the mechanism of space-time and particle production) are an interpretation of dark energy since dark energy is a property of space-time.** The elimination of distance, both in time and in space, by electronic infinity or $e\infty$ (addressed later) supports the idea of Professor Greene's “distant” and “faraway” unfolding / David Bohm's “dimension beyond space and time” being as near as the quantum space of a subatomic particle in your or my brain.

Steady State Universe, Big Bang Subuniverses and DNA's Double Helix

[1] Each one is a “subuniverse” composing the physically infinite and eternal space-time of the universe. The infinite numbers make the cosmos physically infinite, the union of space and time makes it eternal, and it's in a static or steady state because it's already infinite and has no room for expansion. Our own subuniverse has a limited size (and age of 13.8 billion years), is expanding from a big bang, and has warped space-time because it's modelled on the Mobius loop, which can be fashioned by giving a strip of paper a 180-degree twist before joining the ends. (It also has DOUBLE STRANDED, spiralling DNA because the universe is modeled on TWO twisted Mobius loops. Agreeing with a 1919 paper which Einstein submitted to the Prussian Academy of Sciences [“Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of

Matter?"] DNA is made of remarkably warped space-time / extremely intense gravity). "The universe IS something" ("Astronomy" magazine – March 2013, p.66) is interesting. This letter and its reply continue on from Bob Berman's article "Infinite Universe" ("Astronomy" – Nov. 2012) which says, "The evidence keeps flooding in. It now truly appears that the universe is infinite" and "Many separate areas of investigation – like baryon acoustic oscillations (sound waves propagating through the denser early universe), the way type 1a supernovae compare with redshift, the Hubble constant, studies of cosmic large-scale structure, and the flat topology of space – all point the same way." Support for the article - (after examining recent measurements by the Wilkinson Microwave Anisotropy Probe, NASA declared "We now know that the universe is flat with only a 0.4% margin of error." - http://map.gsfc.nasa.gov/universe/uni_shape.html; and according to "The Early Universe and the Cosmic Microwave Background: Theory and Observations" by Norma G. Sánchez, Yuri N. Parijskij [published by Springer, 31/12/2003], the shape of the Universe found to best fit observational data is the infinite flat model).

Newtonian / Einsteinian Space-Time Warping

^ Since the warping of space-time is modelled on two Mobius loops, the first impression is that it should be twice what Einstein calculated. His figure of 1.75 seconds of arc for the deflection of starlight by the Sun has been experimentally proven because starlight which grazes the sun is indeed deflected at 1.75 arcseconds. However, this is only the electromagnetic aspect and represents the warping of space that is created by one Mobius – the other Mobius accounts for the gravitational aspect of space warping, agreeing with Einstein's claim that gravitation and electromagnetism are related [2.1].

[2.1] How is passing starlight deflected towards the Sun? The refracted gravitational wave heading for the sun "captures" [2.2] the light from distant stars that appear close to the rim of the sun before the gravity wave's diverted to the centre of our star (string theory predicts that gravity's gravitons interact with light's photons). Acting as a gravitational attractor, the refracted wave carries the light with it as it bends towards the sun's centre. The light is not carried all the way but breaks free since photons have their own energy and momentum. However, the light is carried far enough to be deflected a tiny amount from its original path. According to Newton's 3rd Law of Motion (to every action there is an equal and opposite reaction), the light will be deflected toward the sun by an equal and opposite amount to the gravity wave's deflection to the solar interior. "Opposite" means the light wave travels away from the sun at approx. 186,282 miles per second and the gravity wave travels into the sun at the same velocity. "Equal" means, since experiments have shown the bending of starlight to be 1.75 seconds of arc (in geometry 60 seconds = 1 minute, 60 minutes = 1 degree, and there are 360 degrees in a circle), the refraction of gravitation from the solar rim is also 1.75 arcseconds (as density increases the deeper the gravity wave goes, the greater its refraction becomes).

[2.2] Gravitons and photons interact via Einstein's mass-energy relation. A gravitational wave acts as an attractor and captures light by feeling friction with the mass-energy of the photons. This causes gravitational refraction or bending in which part of the gravity pushes a photon by travelling in the direction of the centre of each photon in the light (as it progresses to the centre, the 3rd Law of Motion accounts for the photons' reaction of being attracted to the gravitons). Compared to the other forces we know; gravity is incredibly weak and the weak "equal but opposite" reaction cannot overcome the heaviness of macroscopic objects which consequently don't float off towards the gravity doing the pushing. Photons, when pushed towards the surface of Earth, are so tiny and light that they do recoil from the push – they "reflect".

Cosmic Rays, Ultra-High-Energy Cosmic Rays & Today's Speed of Light

The binary digits in space-time (assumed by modern science to be "virtual particles") confer energy (and mass) on cosmic rays that travel far through space, turning them into UHECRs (ultra-high-energy cosmic rays). Naturally, this process does not apply to cosmic rays that have already been emitted as UHECRs from pulsars, gamma-ray bursts, active galactic nuclei, colliding galaxies, etc. ("Ultra High Energy Cosmic Rays: origin and propagation" by Todor Stanev - 30th International Cosmic Ray Conference, 2007 - <http://arxiv.org/pdf/0711.2282v1.pdf>). Similarly, the digits give energy to a star's photons – which has the potential to cause scientific instruments to overestimate the energy released from distant stars. However, this increase in energy of the light photons may be balanced by the stretching of space, which causes decrease of energy (as of 21 March 2013, the Hubble constant, as measured by the Planck Mission, is 67.80 ± 0.77 km/s/Mpc – "Planck Mission Brings Universe Into Sharp Focus" - <http://www.jpl.nasa.gov/news/news.php?release=2013-109&m=news.xml&rst=3739>). Thus, the speed of light in today's vacuum would be a constant.

Why doesn't the stretching of space cause all UHECRs to lose energy and change back to regular cosmic rays? If a UHECR travels through space that is extremely warped (for example, the "coherent space" we call matter, which re-radiates a UHECR as a lower-wavelength cosmic ray upon interaction), it does change. But if its journey is through relatively unwarped and flat space, it remains a UHECR. (Regarding particles as the basis of the universe leads to the interpretation of a UHECR interacting with matter and being re-radiated as a regular-energy cosmic ray. Regarding space-time itself as playing a role in the constitution of elementary particles leads to the interpretation that the stretching of space turns a UHECR into a cosmic ray.)

Electronic Infinity

[3.1] The inverse-square law states that the force between two particles becomes

infinite if the distance of separation between them goes to zero. Remembering that gravitation (associated with particles) partly depends on the distance between their centres, the distance of separation only goes to zero when those centres occupy the same space-time coordinates (not merely when the particles' or objects' sides are touching i.e. infinity equals the total elimination of distance[3.2]). The infinite cosmos could possess this absence of distance in space and time, via the electronic mechanism of binary digits (this would enable it to be as malleable and flexible as anything on a computer screen). To distinguish this definition from "the universe going on and on forever", we can call it "electronic infinity or e infinity".

[3.2] If infinity (not physical infinity, but e infinity) is the total elimination of distance in space-time, there would be nothing to prevent instant intergalactic travel or time travel to the past and future[3.3]. Infinity does not equal nothing - total elimination of distance, or space-time, produces nothing in a physical sense and reverts to theoretical physicist Lee Smolin's imagining of strings as "not made of anything at all" (p.35 of Dr. Sten Odenwald's article "What String Theory Tells Us About the Universe": Astronomy – April 2013). It also reverts the universe to the mathematical blueprint from which physical being is constructed (see <http://vixra.org/abs/1307.0072> – this agrees with cosmologist Max Tegmark's hypothesis that **mathematical formulas create reality**, <http://discovermagazine.com/2008/jul/16-is-the-universe-actually-made-of-math#.UZsHDalwebs> and <http://arxiv.org/abs/0704.0646>). So, infinity = something (mathematics), agreeing with Dr. Sten Odenwald's statement on p.32 of his article, that "The basic idea is that every particle of matter ... and every particle that transmits a force ... is actually a small one-dimensional loop of something.

Interstellar and Intergalactic Travel

[3.3] In July 2009, electrical engineer Hong Tang and his team at Yale University in the USA demonstrated that, on silicon chip-and transistor-scales, light can attract and repel itself like electric charges/magnets. This is the "optical force", a phenomenon that theorists first predicted in 2005 (this time delay is rather confusing since James Clerk Maxwell showed that light is an electromagnetic disturbance approx. 150 years ago). In the event of the universe having an underlying electronic foundation, it would be composed of "silicon chip-and transistor-scales" and the Optical Force would not be restricted to microscopic scales but could operate universally. Tang proposes that the optical force could be exploited in telecommunications. For example, switches based on the optical force could be used to speed up the routing of light signals in fibre-optic cables, and optical oscillators could improve cell phone signal processing. From 1929 until his death in 1955, Einstein worked on his Unified Field Theory with the aim of uniting electromagnetism (light is one form of this) and gravitation. Achievement of this means warps of space (gravity, according to General Relativity) between spaceships/stars could mimic the Optical Effect and could be attracted together, thereby eliminating distance (similar to traversing a wormhole

between two folds in space). And "warp drive" would not only come to life in future science/technology ... it would be improved tremendously; even allowing literally instant travel to points many, many billions of light years away. This reminds me of the 1994 proposal by Mexican physicist Miguel Alcubierre of a method of stretching space in a wave which would in theory cause the fabric of space ahead of a spacecraft to contract and the space behind it to expand - Alcubierre, Miguel (1994). "The warp drive: hyper-fast travel within general relativity". Classical and Quantum Gravity 11 (5): L73–L77. Therefore, the ship would be carried along in a warp bubble like a person being transported on an escalator, reaching its destination faster than a light beam restricted to travelling outside the warp bubble. There are no practical known methods to warp space – however, this extension of the Yale demonstration in electrical engineering may provide one. (And if infinity is the total elimination of distance in space-time, there would be nothing to prevent time travel to the past and future.)



c^2 and the Atomic Nucleus (continuing 1st paragraph's shorthand)

When Einstein penned $E=mc^2$, he used c (c^2) to convert between energy units and mass units. When I wrote $E=mE$ (gravitational energy equals formation of stellar mass equals formation of electromagnetic energy), I split the conversion into two parts (Energy to Mass, and Mass to Energy), in an attempt to be more precise. The conversion number is 90,000,000,000 (300,000 km/s x 300,000 km/s). Since we'll be dealing with numbers in the trillions of trillions, and since the many particles and atoms require varying amounts of gravity for their formation, a good approximation will be to round up the conversion factor to 10^{11} . When gravity forms mass (we can say space-time forms mass since gravity is merely space-time's warping), it loses 10^{24} of its energy or strength (this number isn't randomly chosen but was selected because it fits in with later statements). Though it starts with a strength of 10^{25} , it finishes with far less energy, a much longer wavelength, and a strength labeled "1". After the matter is formed, following gravity waves retain their strength of 10^{25} . Looking at the example of astronomy's gravitational lensing, we can deduce that the amplitudes of the following gravity waves are magnified by the matter's density so they achieve EM's strength (10^{36} times gravity's strength) i.e. 10^{25} is multiplied by Einstein's conversion factor [10^{11}] and gives us 10^{36} . Just as visible light can be absorbed by interstellar dust and re-radiated at infrared wavelengths, the following gravity waves are absorbed by the matter and radiated as longer-wavelength EM waves (possibly gamma rays).

What happens when gravity and electromagnetism interact within an atomic nucleus? If 10^2 gravitons interact with each photon (or 100 photons with each graviton), the strong force is produced (it's 10^{38} times gravity's strength). There are two ways to produce the weak force (10^{25} times as strong as gravity). It could be 1) the normal function of gravity in 10^{25} mode when acting over a

distance of 10^{-18} metres (the weak force's range) i.e. the weak force IS gravity in 10^{25} mode, or 2) the result of EM's photons interacting with 10^{11} **anti-gravitons** i.e. 10^{36} would be divided by Einstein's speed-of-light conversion and give 10^{25} . **Not only does 2) relate gravity and electromagnetism, but it suggests electromagnetism is converted retrocausally i.e. "backwards" (from 10^{36} to 10^{25}), and also plays a part in mass formation along with gravitation (as Einstein's 1919 paper stated).** Let's consider number 1). The weak force is responsible for the emission of particles in radioactivity. Such emission could be regarded as repulsion from the radioactive material. How can we reconcile this with the teaching that gravity always attracts, never repels. There is no dogma in science, and everything should always be questioned. Let's be rebels for a moment and assume gravity accounts for repulsion as well as attraction on the subatomic scale.

Dark Energy and Fractal Geometry

For example, the strong force would represent gravity's subatomic attraction while gravity's subatomic repulsion could be viewed as the emission of particles in radioactivity. If the universe obeys the laws of fractal geometry*, gravity would also account for repulsion and attraction on astronomical and macroscopic scales (it would account for the dark energy pushing galaxy clusters apart as well as familiar concepts of gravity such as attraction of a falling apple to the ground).

*French mathematician Benoit Mandelbrot developed this fractal geometry and coined the word fractal. The diminishing size of spheres may be seen as representing cosmic, galaxy cluster, stellar, quantum-particle scales. We may have varying speed of flow of time during our life because of the accelerating expansion of space-time in the universe. Space is expanding but time is also expanding (and at an accelerating pace). In our youth, it proceeded at a very slightly reduced pace whereas it's going a tiny bit faster now that we've gained experience. So the increased pace is not subjective. If things in space and time were separate, we certainly could never be aware of this accelerating time - the change in our lifetimes is infinitesimal. But things are different if we humans, and the entirety of space-time, are different aspects of the fractal geometry i.e. of the unified field. We are unified with every step of the universe's past and future expansion. Therefore, we can perceive its accelerating expansion ... which we interpret as our having more time in our youth. Our perception of time moving faster will be interpreted by most people as purely subjective and psychological. But in fact, it appears to support the idea of fractals - of gravity accounting for repulsion and attraction not merely on quantum scales but, fractally, also on astronomical and macroscopic scales.

Rebelliousness might therefore solve one of the greatest mysteries confronting modern science (dark energy). It might also help answer the question of whether 5th-dimensional hyperspace exists.

5th-dimensional Hyperspace and Time Travel to Past and Future

Maybe hidden variables called binary digits (binary digits would be the hidden variables which Einstein said carry extra information about the world of quantum mechanics ... and complete it, eliminating probabilities and bringing about exact predictions) could permit time travel into the future by warping positive space-time. And maybe they'd allow time travel into the past by warping a 5D hyperspace# that is translated 180 degrees to space-time, and could be labelled as negative or inverted. (The space-time we live in is described by ordinary [or "real"] numbers which, when multiplied by themselves, result in positive numbers e.g. $2 \times 2 = 4$, and -2×-2 also equals 4. Inverted "positive" space-time becomes negative hyperspace which is described by so-called imaginary numbers that give negative results when multiplied by themselves e.g. i multiplied by itself gives -1 .) The past can never be changed from what occurred, and the future can never be altered from what it will be. Both are programmed by the 1's and 0's.

With a single extra dimension of astronomical size, gravity is expected to cause the solar system to collapse ("The hierarchy problem and new dimensions at a millimetre" by N. Arkani-Hamed, S. Dimopoulos, G. Dvali - [Physics Letters B - Volume 429, Issues 3-4](#), 18 June 1998, Pages 263-272, and "Gravity in large extra dimensions" by U.S. Department of Energy - <http://www.eurekalert.org/features/doe/2001-10/dbnl-gil053102.php> However, collapse never occurs if gravity accounts for repulsion as well as attraction on both subatomic and astronomical scales (accounts for dark energy and familiar concepts of gravity, as well as repelling aspects of the electroweak force [such as placing two like magnetic poles together] and attracting electroweak/strong force aspects). "Electroweak" and "strong" force can be united in that sentence because gravitation and space-time are united with both the (electro)weak and strong nuclear forces.

Dark Matter

The average density of the Milky Way is much less than the solar system. Picture the galaxy, except for the central dense bulge that may be roughly 10,000 light years in diameter, made up of solar systems like ours and separated by 4 or 5 light years (the closest star to the Sun is Proxima Centauri, 4.2 light years away). Within those systems, there is a lot of mass and density in the form of stars, planets, moons, asteroids, comets, gas, and dust (more than 99% of our own solar system's mass is in the Sun). But the vast reaches of near vacuum between systems lowers average density enormously – the MacMillan Encyclopedia of Physics says the average density of matter between the stars of the Milky Way is 0.1 neutral hydrogen atoms per cubic centimetre. Since density corresponds to concentration of wave packets – a term from quantum mechanics describing, here, matter's gravitational building blocks - and magnification of gravitational waves, there would be extremely little magnifying of gravity waves in interstellar space (a process related to gravitational lensing). And there would be insufficient gravitational magnification to push or accelerate the stars in the central core or bulge beyond the orbiting speeds of the galaxy's outermost stars.

In the 1970s, astronomer Vera Rubin concluded outer stars were being sped up by the gravitational attraction of unseen Dark Matter in a halo well beyond the galaxy. This partial revision of gravity states there would be no such thing as dark matter of this nature. However, the term “dark matter” could be used to describe particles in a 5th-dimensional hyperspace, or travelling through time, that would be invisible but still exert gravitational influence (in a universe structured according to the rules of fractal geometry, 5th dimensional hyperspace would occupy every fermion and boson, alongside space-time).

Neil Armstrong in Perpetual Motion

Referring to the clause “perpetual-motion machines are just a mirage” in your article’s first paragraph – I’m so sorry about Neil Armstrong's death. I feel as though I knew him, but I never had any contact with him. However, I think he's still alive - in a different form, somewhere in the universe ... somewhere in time. After all, science's Law of Conservation has known since the 19th century that neither matter nor energy (including the matter/energy of the first person on the moon) can ever be destroyed or created - they only change form, as in the death of an existing form and birth (from a pre-existing form?) of a man named Armstrong. Before you say science’s Law of Conservation cannot be personalized, please read the next paragraph.

If we stop thinking at that point where death occurs; we'd assume that at death, his body became disorganized and returned to dust - and that his mind simply ceased to exist when his brain stopped functioning. But let's keep thinking. If nothing in any time can be destroyed, all time might be like a DVD. All of the DVD always exists even though a very limited set of sights and sounds can be perceived at any point during its playing. Similarly, Neil always exists even though we can't physically perceive him at this time. In different parts of the cosmic DVD; he's forever being born, forever taking that first step on the moon (is he in perpetual motion?), forever resting in peace (I believe English physicist Julian Barbour has the same understanding of time which this sentence speaks of). And I think medical science will someday advance so much (and in such unexpected ways) that we'll be able to say he's forever being resurrected. How could the time travel loved by theoretical physicists come to pass without this "cosmic DVD"?

Law of Conservation, Origin of Life, and Humanity-God Partnership

The idea of quantum fluctuations is valid (a quantum fluctuation is the temporary change in the amount of energy at a point in space). But forget quantum fluctuations that mysteriously happen for no reason. And forget spontaneous generation of life from nonliving matter. I think the universe, and life, began because brains acquire knowledge from the 4 dimensions of space-time. Then brains interact with a 5th-dimensional hyperspace to purposely switch the binary digits which computers use from 1 to 0 or vice versa[*]. Origin of life, the universe

and everything comes from something (interaction of brains with hyperspace) and is important for 2 reasons:

- 1) Science's own Law of Conservation says the total mass (or matter) and energy in the universe does not change, though the quantity of each varies (I interpret this Law as saying – to get matter and energy, you have to start with matter and energy), and
- 2) By actual experimentation the great 19th-century French scientist Louis Pasteur disproved the false theory of spontaneous generation of life, and proved biogenesis (that living things descend only from living things) – see “The Microbial World – A Look At All Things Small”
http://www.microbiologytext.com/index.php?module=Book&func=displayarticle&art_id=27
and “ Biogenesis and Abiogenesis: Critiques and Addresses”
<http://aleph0.clarku.edu/huxley/CE8/B-Ab.html>

In relation to biogenesis, consider the Miller-Urey Experiment of 1952. Here, amino acids (which are relatively simple, and are the building blocks of protein) were made from inorganic material and by natural causes in a lab. Subtract Stanley Miller and Harold Urey from the experiment, and the experiment would obviously fail (because it would never have been started). Similarly, subtracting humans of the distant future from the origins of life makes it impossible for amino acids and inorganic materials to be bioengineered to form complex plants and animals, whose adaptations are often called evolution. The future humans could use terraforming (creation of Earthlike planets) and bioengineering that can hardly be imagined at present.

This seems to validate atheism, but I say God must exist. God's existence cannot possibly be scientifically comprehended in the current non-unified understanding of the cosmos. Thus, many scientists need to invoke the existence of an unlimited number of parallel universes having limitless combinations of the laws of physics (so one of those universes would produce all the correct laws that enable beings such as ourselves to exist). A non-supernatural God is proposed via the inverse-square law's infinite aspect coupled with eternal quantum entanglement, but Einstein taught us that time is warped. Warped time is nonlinear, making it at least possible that the binary digits composing space-time and all particles originate from the computer science of humans. Binary digits (BITS) only suggest existence of the divine if time is linear. The inverse-square law states that the force between two particles becomes infinite if the distance of separation between them goes to zero. Remembering that gravitation partly depends on the distance between the centres of objects, the distance of separation between objects only goes to zero when those centres occupy the same space-time coordinates (not merely when the objects' sides are touching). That is, infinity equals the total elimination of distance – the infinite cosmos could possess this absence of distance in space and time via the electronic mechanism of binary digits, which would make the universe as malleable and flexible as any

image on a computer screen. Zero separation is the case in quantum-entangled space-time and physicist Michio Kaku says in his book "Physics of the Impossible" that modern science thinks the whole universe has been quantum-entangled forever. This means there's still room for the infinity known as God. God would be a suprapantheistic union of the universe's spatial, temporal, hyperspatial, material and conscious parts; forming a union with humans in a cosmic unification, and forming a universal intelligence.

Star Trek replicator & transporter, Earth as Paradise + Money Free Zone That Colonizes Cosmos, Geocentric Cosmos (not physically)

This section of the article starts with Bill Gates, the co-founder (with Paul Allen) of the software corporation Microsoft. This is because part of the inspiration for writing this was a comment I read in a magazine about Bill Gates being the world's richest man. It ends with the human race's own technology causing it to transcend money and develop a society akin to paradise on Earth - i.e. we enter a doorway to a new world . . . a Stargate.

$E=mc^2$ (Albert Einstein's formula unifying energy [E] with mass [m] and relating both to the velocity of light squared [c^2]) makes a person suspect the apparently solid world of matter is really an illusion, and you and I are actually made of insubstantial energy. String theory, which rose to the forefront of physics during the 1980s, proposed that the fundamental constituents of nature are not particles but one-dimensional structures called strings. This heightens previous suspicions, and we wonder if the one-dimensional structures are in fact pulses of energy. Then along comes "TIME Australia" magazine's Feb. 26, 1996 article "What's Hiding in the Quarks?" (which says quarks seem to be made of even tinier things). Finally, we might feel justified in assuming our suspicions were correct and that these "even tinier things" MUST be pulses of electromagnetic energy (meaning all substances are indeed insubstantial).

All forms of electromagnetic energy (radio, microwave, infrared, visible light, ultraviolet, X-ray, gamma) travel as waves. How do we create an analog structure like a wave from a digital structure like a pulse? By adding the necessary number of pulses to the medium in which a wave travels to form the wave's amplitude (height) and wavelength (distance from crest to crest). How could we create matter from waves? By superimposing waves of visible, gravitational*, magnetic, electrical, etc. frequencies into holograms (near the end of the '80s, the magazine "Scientific American" reported that holograms have been made not only with visible light and X-rays, but also with microwaves and sound waves).

* Einstein predicted the existence of gravity waves but they haven't been discovered yet.

If this article is correct, pulses are the basis of both waves and matter.

Therefore, matter and energy would be digital in nature. Can this be extended, via strings, to space itself as well as to time (the 4th dimension - what I'll term "subspace", since I'm a fan of science fiction)? **In 1917, Einstein calculated that 3 universes could exist in the cosmos: can strings extend the digital cosmos of 3-dimensional space and 4th-dimensional time into a 5th dimension (let's call it hyperspace)?** Assuming we live in a digital cosmos, we are reminded of that other digital entity called the computer - and must wonder if all those pulses of energy result in a cosmic intelligence that is all-powerful and present not just everywhere in space and time, but also "outside the universe" i.e. in hyperspace. The existence of such a "cosmic computer" would imply that both living and nonliving matter may be altered by programming, when people learn how to do this. Invasive procedures such as surgery would become obsolete.

The waves of energy which holographically compose matter could be digitised and transmitted over the Internet - and the receiver's computer could be equipped with sensors to decode the mix of frequencies, as well as an assembler that reproduces this mix and radiates it to create products indistinguishable in any way from the original product (the frequency mix could also be electronically recorded). The difference between life and nonlife appears to be merely one of complexity. So after inanimate objects and parcels have been successfully produced and emailed (today's electronically controlled 3D printers may be the first step to replicators), more advanced software will be developed and allow things like fruit and vegetables, or living animal/human tissues, to be transmitted (or transported) between places i.e. in space and between times (I believe time will be navigated in the future just as ordinary space is today).

This advanced software could also be used to genetically engineer people whose genes have been disassembled into subatomic, electromagnetic pulses and manipulated by computers. An opportunity to possess an eternally youthful body and a brain free of criminal tendencies may therefore exist. When we develop this electronic hardware and software, and also acquire the science-fiction-like technology of time travel, everyone who has long since died could have their minds downloaded into reproductions of their bodies and be resurrected (establishing colonies throughout space and time would prevent overpopulation).

These colonies throughout space and time would be composed of what we'd call aliens or extraterrestrials. I may be wrong but I think they'd be our descendants (our descendants could only exist before us if time is not exclusively linear). I've heard it said that angels rejoiced at the creation of the Earth. I don't think this necessarily has a religious meaning. I suspect it indicates an unconscious belief in every mind, ancient or modern, that Earth really is important ... that we're not just an insignificant rock orbiting an average star. Maybe life on Earth is the starting point for development of the magnificent Universe that awaits us... and for extraterrestrial life that descends from us, wherever and whenever it may be found. Since they might be "separated" from Earth of the early 21st century by billions of light years and could also be billions of years in either our past or

future, they might see our present global financial crisis differently from us and might view it this way:

“Until the 1920s, money was backed by gold in many countries (the gold standard): a pound note or dollar bill could be exchanged for a given amount of gold (hence such words on banknotes as ‘promise to pay’) and the amount of money issued by banks was related to the amount of gold held. The first bank notes issued in Europe were by the Bank of Stockholm in 1661. In the absence of general confidence that it will persist, the gold standard loses its advantages e.g. if it is regarded as permanent it gives almost fixed exchange rates, which facilitates international trade and credit (its disadvantages then assume control – it deprives countries of control of their own monetary policy; and makes the world money-supply depend on the rate of gold discoveries). It seems unlikely that the gold standard will ever be restored. Money is now increasingly not in tangible form, but consists of balances in accounts at banks, exchange being by means of cheques, credit-cards or charge-cards, and by credit-transfer, where one account is reduced (debited) and another increased (credited) by the same amount electronically. Modern systems are reducing the dependence on cash, hence the emergence of the phrase, the ‘cashless society’.”
(from Penguin Encyclopedia, 2006 – “money” and “gold standard” articles)

The worldwide economic crisis has the potential for many political benefits, since cooperation will be the only way to maintain and improve our living standard if monetary systems fail. The crisis would encourage domestic and international peace and sharing - perhaps even paradise on earth ...

The present global financial crisis may indicate that the world we live in today has lost stability and is on the brink of changing. Therefore, this "crisis" might be necessary to awaken us to the potential of tomorrow. Just because money has been making the world go round for thousands of years doesn't mean money will be the way of the world forever (we've been playing worldwide Monopoly for ages, but we can stop one day). We should start looking for an alternative system to preserve, and increase, standards of living now in case we need it tomorrow. This scheme should not use any form of monetary organisation or be based on gold, silver etc. It should, idealistic and naive as it appears at first, be based on mutual cooperation and the goal of ushering in a paradise on earth. We can say there can never be paradise on earth; but the human instinct to survive is much stronger than our tendency for other types of self-interest, and greed, and to not cooperate with each other. If money ceases to be an option; most people will gladly cooperate with those we would have previously regarded as competition, or even as an enemy, if it's the only way to maintain and improve our living standard.

Band-Gap Implants in the Brain

[*] What kind of technology could manipulate the unification and zero separation of all space-time? Band-gap structures ... these are more advanced than replicators, transporters and starships. While these things can do what band-gap implants do, the implant technology is not external but is located solely within the brain. An even more advanced system - one that has the advantage of seeming more natural to many people – may be possible. That system would do everything band-gap implants do, but would rely solely on the entire universe and all space-time-hyperspace being a unification or unified field. Whatever anyone can think of can be done – as long as it doesn't violate the laws of physics (and the limits of physical law won't be understood for maybe a thousand years).

Morpho butterflies create colour by selectively adding and deleting certain wavelengths of light. Physicists have only recently devised comparable materials, called photonic band-gap crystals; and are now exploring their use in phone switches, solar cells and antennas. No surprise, then, that some engineers are looking to the living world for the next generation of optic inspirations. I believe advances in engineering and biology will enable humans, like the morpho butterfly, to selectively add and delete certain wavelengths of light. But the word "light" need not only refer to visible wavelengths. It can be extended and refer to any wavelength of the electromagnetic spectrum. Science accepts that radio, infrared, ultraviolet waves and X-rays as well as gamma radiation are all forms of light.

Suppose matter acquires all its properties (including mass) by the superimposing of electromagnetic and gravitational waves (computer-generated in a 5th dimension and projected into the hologram of 3+1 dimensions which we call space-time). So the day will come when we can add or delete wavelengths of matter anywhere and anytime we choose!

I anticipate people will oneday have band-gap structures in their brains that are no bigger than a computer chip (these won't require surgical implantation, but simply downloading, because of the pre-existing unified and digital nature of all parts of the universe). Photonic band-gap crystals would, of course, only deal with light in its photonic forms (energy forms such as visible light or radio waves). The band-gap structures I have in mind would need to deal with forms like genes, so they could add or delete anything and everything we choose. They might accomplish this by acting similarly to a modem that acts on a scale billions of times smaller than a modem manufactured by nanotechnology, and would be capable of manipulating digitised matter. Then they could emulate computers' copy/paste function to add things; as well as their delete function, to remove things (now that's what I call genetic engineering!) This ability must only come to fruition in a future, ideal society: it would only be wasted and abused in the present warring and selfish world!

Cosmic Expansion, Accelerating Expansion, and Deleted Expansion

Referring to the statement "The universe appears to be expanding" in "Why Energy Seems To Disappear" - I think the universe is physically expanding. But I also think there is a method within the universe which will allow us to act as though distances in both space and time do not exist. In other words, we can act as though the universe is not expanding - we'll even be able to act as though the expansion that has already occurred has been deleted. If infinity (not physical infinity, but e infinity) is the total elimination of distance in space-time, there would be nothing to prevent virtually instant interstellar or virtually instant intergalactic travel, or time travel to the past and future.

About "the expansion of the universe now seems to be accelerating" - The binary digits of 1 and 0 in Mobius loops and Figure-8 Klein bottles (I like to consider these things parts in what I call "digital string theory") could produce more and more space-time, thus accelerating expansion. "Produce" isn't exactly the right word since the Law of Conservation says neither matter nor energy (nor space-time) can be created or destroyed. More space-time must result from "recycling" (changing of the pattern of 1's and 0's from some other configuration: maybe it was converted from some matter or energy).

Variable Speed of Light

About "Because each photon in the region becomes less energetic as space expands, this calculation suggests that the total amount of photon energy in the region and, by implication, in the rest of the universe must be going down" (in "Why Energy Seems To Disappear") –

I think the Scientific American article - Misconceptions about the Big Bang. Charles H. Lineweaver and Tamara M. Davis in Scientific American, Vol. 292, No. 3, pages 36–45, March 2005 - took a shortcut and didn't explain things completely when it said "As the photons travel through expanding space, they lose energy and their temperature decreases." I think the journey through space gives them more energy and increases their temperature.^ However, this energy and temperature is lost by the stretching of space - the longer wavelengths which stretching gives the radiation means photon energy is greatly reduced and the universe cools.

^ Through interaction with virtual particles in the form of binary digits, it confers energy (and mass) on cosmic rays that travel far through space, turning them into UHECRs (ultra-high-energy cosmic rays). UHECRs can be emitted by supermassive black holes in Active Galactic Nuclei but can also acquire their energy when cosmic rays travel far through space. Charged particles travelling through space with energies a billion times more than the highest-energy UHECRs currently known are suitable as a probe into realms where the theory of

special relativity breaks down. Physicist Lee Smolin has written that if such cosmic rays can be confirmed, it "would be the most momentous discovery of the last hundred years—the first breakdown of the basic theories comprising the twentieth century's scientific revolution." (Smolin, Lee – “The Trouble With Physics” - Houghton Mifflin Harcourt, 2006, p. 222)

Increase in energy of the light photons is balanced by the stretching of space, which causes decrease of energy (as of 21 March 2013, the Hubble constant, as measured by the Planck Mission, is 67.80 ± 0.77 km/s/Mpc – “Planck Mission Brings Universe Into Sharp Focus” - <http://www.jpl.nasa.gov/news/news.php?release=2013-109&rn=news.xml&rst=3739>). Thus, the speed of light in the vacuum of today's space is a constant. Energy from “virtual particles” is gained at a constant rate, while energy lost by expanding space stretching wavelengths is increasing due to space's accelerating expansion. If this acceleration continues, visible light will lose more and more energy, and its photons will slow down and even stop. This recalls the Variable Speed of Light theories – Albert Einstein in 1911, Robert Dicke in 1957, Jean-Pierre Petit in 1988, John Moffat in 1992, and the two-man team of Andreas Albrecht and João Magueijo in 1998.

Springy Rubber Balloon of G and EM

About the side-comment “The metaphor of the universe as an expanding rubber balloon should be taken with a grain of salt.” In my opinion, a better metaphor would be to compare the universe to a rubber balloon that is completely embedded with built-in rubber springs i.e. our universe would be a springy rubber balloon. If we just think of an expanding rubber balloon, that could be compared to space-time's expansion and the balloon's curvature could represent gravitation, the warping of space-time. If we think of a springy rubber balloon, the springs could represent the waves that are part of space-time and are identified as electromagnetic. The size of a spring represents the speed of light (approximately 299,792 kilometres [186,282 miles] per second) (frames are created in the 5th dimension by binary digits and their very rapid display is what we call motion). When space expands (when the balloon stretches), the springs aligned in the direction of expansion - all springs/waves, since expansion is in every direction – expand or stretch by the same amount i.e. the electromagnetic waves increase their wavelength. They also appear to increase their speed because they cover, in the same period of time, more distance on the balloon's surface after it has been stretched than they would have prior to the stretching. However, the increase is relativistic – the increased speed is entirely due to the stretching of space (electromagnetic waves cover more distance because their own speed is added to the stretching of space-time). The speed of waves can vary because space-time itself plays a role in the constitution of elementary particles, which means the motions of particles may be viewed as expansion and contraction of space. Light's speed in vacuum is 3×10^8 metres\second, 2.26×10^8 m\s in water and 1.97×10^8 m\s in glass.

Billions of Years in the Past, Trillions of Millennia in the Future

Talking about energy increase and decrease - it was necessary for the early universe to undergo inflation (extremely rapid expansion by a factor of at least 10^{78} in volume, 10^{-36} of a second after the big bang). Recent cosmology text books with extensive discussions of inflation are by Liddle and Lyth (2000), Mukhanov (2005), Kolb and Turner (1988), Linde (1990), Peebles (1993), Lyth and Riotto (1999), Linde (2012), Guth (1997) and Hawking (1998). This rapid expansion converted short wavelengths (such as gamma rays produced in the big bang) into useful and necessary longer-wavelengths (like visible light). Eventually, this subuniverse will increase its size another 10^{78} times. Then the curving lines of waves will be stretched flat and light's photons will stop, possessing no energy at all. There's no need to worry and speak of cosmic death, however. This subuniverse will have dispersed into, and mingled with, many other subuniverses by then (it'll be dispersed into WMAP's infinite, flat universe). Maybe we'll rejuvenate our subuniverse with another big bang many trillions of millennia before this happens. Maybe we'll go live in some other subuniverse and let this one disperse. Perhaps, in this distant future, we can all have an immaterial body designed in the far future to overcome physical limitations (and that body might be quantum entangled with all space and time). Whatever happens, life goes on.
