



“AVOIDING THE EXTREMES OF GLOBAL WARMING” by Antonio Cassella

ABSTRACT. This letter hypothesizes that the **power** hidden in the **alliance** (3) of **quantum** (2) with **classical** (1) computing¹ may allow us to avoid the extremes of global warming, prevent the premature death of the **young** of all species, and arrive at sustainable Progress.²

1. INTRODUCTION: ESCAPING THE LAST MILE

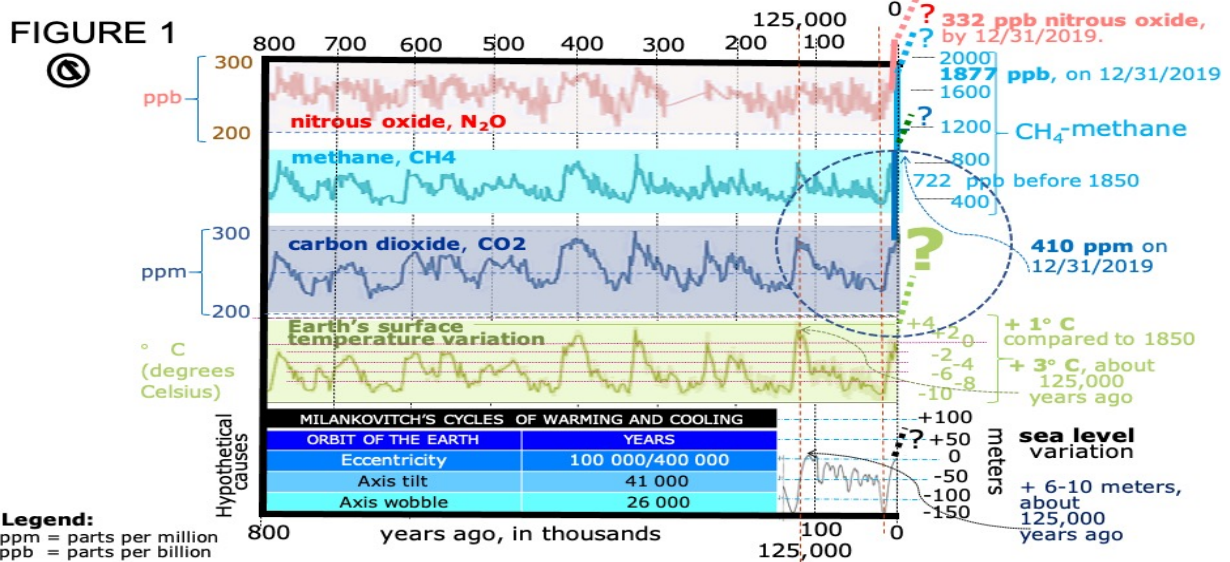


Figure 1 shows that in the last 800,000 years the concentration of carbon dioxide (CO₂), of methane (CH₄), and of nitrous oxide (N₂O) in Earth's lower atmosphere have varied **simultaneously** with the change of surface temperature.³

It is not easy to separate causes and effects. Past climate changes began with a temperature rise caused by the onset of a Milankovitch's cycle; especially the eccentricity of the elliptical orbit of the Earth around the Sun; but at present, the anthropogenic kick of CO₂, CH₄, and N₂O are the cause of the rise in temperature. Hence, I posit that if surface temperature follows our GHGs kicks, we will experience a serious worsening of the phenomena linked to climate variations.

A boost of at least 1° C (degree Celsius) has already occurred in the temperature of the lower atmosphere after the spread of the Industrial Revolution. In order to avoid too severe nonlinear extremes (e.g., hurricanes, tornadoes, droughts, and floods), the IPCC (International Panel on Climate Change) advises to limit future increases to 0.5° C (IPCC, 2019).

¹ In any newsletter published by Research Autism LLC and in Antonio Cassella's printed writings: The invariance kept by the **first attention** (1) is underlined; the temptation sought by the **second attention** (2) wronged in autism is given in **bold**; and the **third attention** (3) damaged in schizophrenia, which renovates reality and the self (e.g., one's own personal Third Point), combines underlining with bold or is shown through an irregular initial Capital.

² The Logos Heuristics Newsletter (issued bimonthly) about applications of the Third Attention is offered without cost at researchautism.com, a website hosted and protected by GoDaddy.com. This issue is included in the Creative Commons License as (example of citation): Cassella, A. (2021). Avoiding the extremes of global warming. *Logos Heuristics Newsletter*, 2(1), 1-8.

³ The temperature variation is based on Antarctic ice cores in a NASA graph by Robert Simmons and data by Jouzel et al. (2007), published by NASA in 2010. Carbon dioxide, methane, and nitrous oxide variations from 800,000 BCE (Before the Common Era) to 2015 CE (Common Era) by United States EPA (Environmental Protection Agency), published in the EPA website in August 2016. The latter too are based on multiple data from Antarctic ice cores. Sea levels were taken from a curve published by NOAA and modified by the author for the last 22,000 years.



I present here two premises:

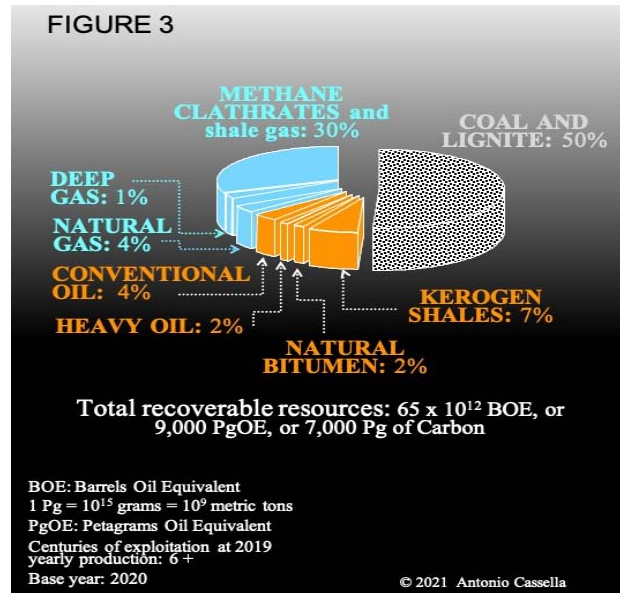
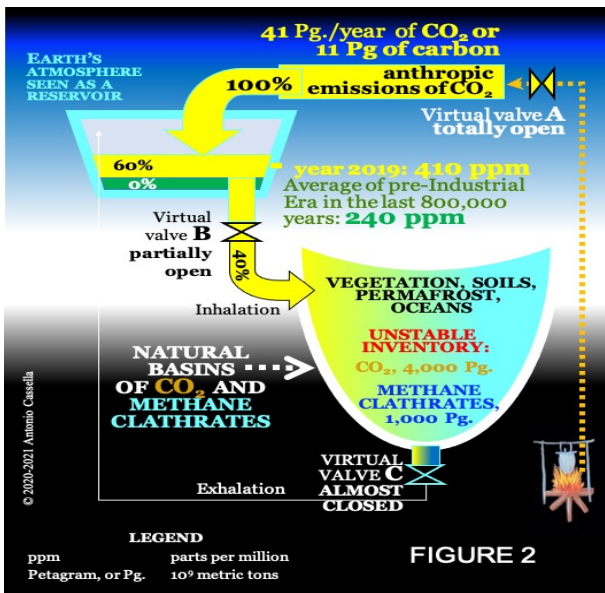
- a) *The **nonlinearity** outlined by the IPCC (2007, 2014, 2018, 2019) responds to the **square of the rise of Earth's surface temperature since 1850**; and*
- b) *sustainable Progress rests on **allying quantum** with **classical** computing in any person, culture, and country.*

The first hypothesis implies that an increase of 0.5° C will cause a 1.5 x 1.5 = 2.25 increase in the strength of hurricanes/cyclones in the world, whereas a global warming like the Paleocene-Eocene Thermal Maximum (PETM) of 56 million years ago (+6-8° C) would bring a worsening of 36-64 times in the strength of climate upheavals. And the second hypothesis is meant to preclude a future PETM followed by a Permian-Triassic Hyperthermal (PTHT).

The PTHT, in which surface temperature variation increased to +14° C (14 x 14 = 196) killed more than two thirds of Earth's species. *The Anthropocene hyperthermal might cause a similar extinction.*

2. BACKGROUND: WHAT WE KNOW ABOUT EXCEPTIONAL CARBON INTRUSIONS

After defining 1 Petagram (Pg) as 1 x 10⁹ metric tons, I assess at 7 Pg of carbon (C) the yearly contamination of Earth's atmosphere (60% of incoming C, Figure 2) in 2020 (BP, 2020).



The atmosphere contains about 800 Pg of Carbon in the CO₂ and methane that joins water vapor and other greenhouse gases in retaining some of the heat provided by the sun. All in all, GHGs preclude a cold lower atmosphere (-18° C), while favoring the photosynthesis of plants and the life of their animal devourers. Before 1850, the atmosphere contained 40% less CO₂ than today.

Rocks on Earth (mostly shales and limestones) contain a pool of 100 million Pg of carbon⁴; 7,000 Pg (my valuation in Figure 3) tallies the fossil energy resources (coal, oil, and gas) contained in geological deposits; and I posit that 2,000 Pg of unstable carbon remains imprisoned in permafrost.

Oceans' bottoms keep their 40,000 Pg of carbon, while some of it is exchanged with the atmosphere near the surface. The carbon absorbed by plants through photosynthesis (120 Pg) is balanced by the carbon released by the expiration of plants (60 Pg) and soil (60 Pg). The answer to the question of whence comes the CO₂ gained by the atmosphere, when its temperature goes up (Figure 1)

⁴ Data collected in December 2020 from the website of the *Globe Carbon Cycle* project of the University of New Hampshire (USA).



through solar forcing, remains obscure, whereas our geometric rise and energy intake are clear.

World population has grown from 10 thousand individuals, after the Toba erupted 75,000 years ago, to almost 8 billion at present. Also our use of energy has swollen. The use of energy per-capita was 0.5 BOEPY (barrels of oil equivalent per year) (Malanima, 2014) in the Age of Food that started six million years ago, when hominins outsmarted the best hyenas; 1.14 barrels in the Age of Fire stolen by Prometheus, since 1 million years ago; and 1.3 barrels in the Agriculture Age, since 8,000 BCE (Before the Common Era). *A per-capita consumption of 13 BOEPY in 2019 shows that each of us guzzles ten times the energy used by an ancient Egyptian farmer; and collectively, about 100,000 times more fossil fuels than the first farmers, when sea level was 25 meters lower than today.*

Carbonic acid is polluting our oceans; food and water supplies will wane; and nonhuman free species are vanishing within the current sixth extinction. Will the young have a future?

Due to the faster rate of pollution of the atmosphere with carbon dioxide in modern times, Babila et al. (2018) hypothesize that *the acidification of Earth's oceans at the end of the 21st century will be more severe than the one that occurred in the past PETM.*

Foster et al. (2018) value our knowledge about the extreme effects of accelerated intrusions of carbon into Earth's atmosphere. For example, the surface temperature increase, ocean acidification, acid rain, ice-free poles, reduction of polar albedos, ocean anoxia/euxinia (lack-of-oxygen/abundance-of-hydrogen-sulfide), higher sea levels, increased erosion, and mass extinctions.

Svensen et al. (2018) wrote that 252 million years ago magma coming from the Siberian Traps large igneous province crossed fissures and deposits rich in carbon, which reached the atmosphere at the end of the Paleozoic Era. *The hyperthermal between the late Permian and the Triassic periods (PTHT) caused Earth's third and most severe mass extinction.*

Although they admitted our blindness about unknowns that cannot be modeled satisfactorily by science, Augland et al. (2019) confirmed the role of the repeated eruption of the Siberian Traps in inducing the bleak reality of the PTHT.

Benton (2018) researched the killing mechanism of the PTME (Permian-Triassic Mass Extinction), in which most Earth's species vanished. He stressed that in the oceans, warming from above and anoxia from below were caused by intrusions into the atmosphere of carbon dioxide, followed by methane intrusions from crystal hydrates. He also pointed out that the hypoxia (deficiency of oxygen) reaching the tissues of living beings and hypercapnia (or too much carbon dioxide in the blood) may have combined with the euxinia caused by the *rise of hydrogen sulfide from the seas.*

In the Pangea landmass that extended from pole to pole in the PTHT, extinction might have responded to a high surface temperature (40° C), draughts, wildfires, acid rain, and alterations of the ozone shield (Kump, Pavlov, and Arthur, 2005; Ward, 2006). Kump (2018) added that recovery after the PTHT was hampered during million years by a weak carbonate-silicate weathering feedback.

In truth, the causes of the third and largest extinction on Earth may be **multiple**, as in the 12 assassins that stabbed the victim in Agatha Christie's novel, *Murder in the Orient Express*, or the 23 stabs that bled Julius Caesar to death in the Roman Senate on March 15, 44 BCE. The ongoing sixth extinction of nonhuman species and the looming global warming, however, have a unique cause: **human ambition**. *The actual anthropogenic eruption of carbon dioxide, methane, and nitrous oxide may cause soon a repeat of PETM and PTHT.*

Science can help—e.g., by providing fuel cells that would release energy while sequestering carbon (CCS) (Bove et al., 2020). Avoiding a new PETM and PTHT, however, cannot be left to science alone. We should also deepen our knowledge of the mysterious alliance (3) of **quantum** (2) and classical (1) neural computing (Cassella, 1997, 2000, 2002, 2015) enclosed in the Mesoamerican myth of the demigod Quetzalcoatl **going** to Venus as a **lying devil** (which autistics cannot **do**) and **returning** from Venus as a **Saint** who **seeks the truth** (which schizophrenics cannot **do**).

Quetzalcoatl's **going journey** with the **morning star** and his **return** with the **evening star** is a forgotten metaphor. Will our grandchildren fall into the trap unleashed by scientific progress coupled



with social regress? Or can our Vision (within the Third Attention) and Will (within a particular Third Point) save them by **choosing repentance** in the return of **Quetzalcoatl**?

3. DISCUSSION: THE PRINCIPLES OF THE LOGOS HEURISTICS

The **suicidal aim** of changing Earth's vital atmosphere into the poisonous one around Venus (90% CO₂ and 500° C near the surface) by burning the carbon trapped in shales is unfeasible. Indeed, freeing half of the carbon contained in the buried resources of fossil fuels (7,000 Pg in Figure 3) will raise atmospheric CO₂ from 0.041% to more than 0.1% (or 1,000 ppm) in the 21st century. That effect will suffice to torture our grandchildren before leading them to a premature death.



Classical computing tells us in Figure 4 (eighth principle on the left) that in spacetime an effect must follow its cause. Hence, we feel lost when we cannot separate a cause from its effect. In the imagination created by quantum **hyperspace** (Caramazza, 1994), however, the inability to establish a new classical sequence allows us to step into the **coherence phase** of quantum computing, *if we decide to face a critical problem*. In **facing a problem**, we need to **side with both** a cause and its effect in hyperspace (Figure 4, 8th principle on the right), which stresses the **infinite speed** attached to the Ubiquity of **simultaneity**.

The first logos heuristics Newsletter outlined the central role of the first two sets of principles in classical spacetime and quantum hyperspace. The second letter here leans on the 8th set (Figure 4) to show that an expansion to ten sets is possible. (I arrived at 20 sets before realizing that the first two sets include all others.) After all, the **infinity** that results from **siding with both** a cause and its effect within Ubiquity has to embrace the zero of nothingness (Coincidence) before the encounter of **hyperspace** with spacetime (Cassella, 2019b). Nothingness makes the return door.

THE MADNESS OF THE SIMULTANEOUS GROWTH OF ECONOMY AND POPULATION

In the hyperspace of our mind, natural positive and negative feedbacks may help us **uncover** the cause of past global warmings and their ultimate effects. Figure 1 shows indirectly that in the past 800,000 years an initial boost of heat, induced by changes in Earth's pattern of rotation around the Sun, caused the temperature of the lower atmosphere and its content of CO₂ to increase alongside the content of methane and nitrous oxide. Sea level followed.

For example, in the last episode of climate change about 125,000 years ago, after an initial rise of temperature, the melting of Greenland glaciers and the partial melting of Antarctic ice caused the

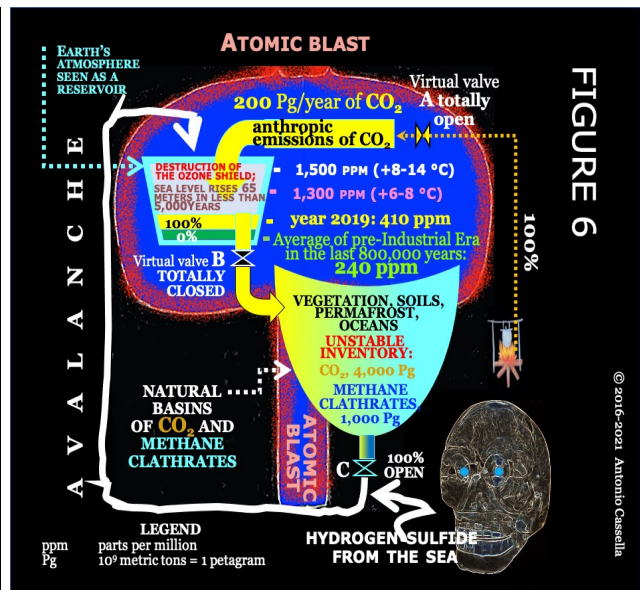
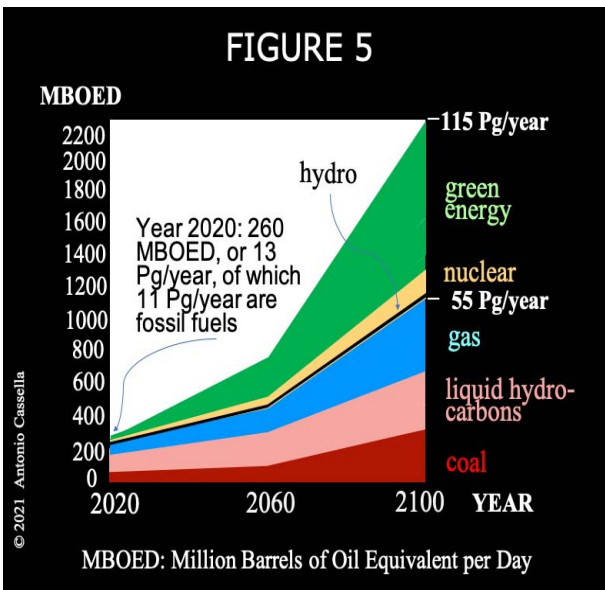


level of the sea to rise by 6-10 meters above present values. Some consolation can be gained by realizing that it may take 5,000 years to melt the Antarctic glaciers and reach a consequent rise of sea level by 65 meters; if the increase of surface temperature remained under 3° C.

On one hand, in the last 800,000 years the temperature rise from added insolation (the initial cause) increased the content of CO₂ in the atmosphere (the effect), which caused a further rise of the temperature, the melting of methane-clathrate crystals, more water vapor, and a higher temperature (e.g., +3° C). Since methane lasts less than CO₂ in the atmosphere, once the source of methane was exhausted, its concentration would go down, reducing surface temperature and the content of carbon dioxide and other GHGs. On the other hand, the melting of Earth's permafrost or the disruption of oceanic currents could have caused the rise and fall of carbon dioxide and methane.

Within an anthropogenic cause of global warming, disruptions hide around the corner. After all, everyone wants a bigger car, more electricity, a climate-responsive apartment, a better dinner, and a longer life. Since one billion people drink contaminated water and get barely a starchy breakfast, some experts may hypothesize that a high global economic growth, in the like of the one that China experienced since the death of Mao Zedong, would cure the ills of poverty (Cassella, 2018b).

Figures 5 and 6 show, however, that the aim to remove poverty by a high economic growth would be counterproductive, even if energy efficiency doubled and carbon-free energy went from 10 to 50%.



A high economic growth would stand as the main cause of a PTHT-like avalanche (Figure 6). At the same time, the proliferation of nuclear weaponry, terrorism, and the exacerbation of human hubris would increase the risk of a nuclear conflagration, in which the power of one million Hiroshima bombs would destroy most cities on Earth. However, separating the quantum computing harmed in autism from the one spoiled in madness can help.

We know that we need to shortcut the inertia of global warming, nuclear war, abject poverty, cognitive degeneration, social regression, and terrorism. In my view, those aims can be achieved by deepening our understanding of the potential alliance of classical with quantum computing outlined in Figure 4.

Today's science and math cannot easily convince most humans to reduce their production of offspring and an economic growth supported by the burning of fossil fuels, the excrement of the devil. We should also use Sacred Texts and works of art to convince most diabolical leaders, their corrupt buddies, and even their cohorts of slaves. Actually, no school or religious institution teaches in depth the wonders and dangers of quantum computing.



THE GOING OF AMBITION AND THE RETURN OF JUSTICE IN A SCHOOL

At present, 98% of us are cognitively fit to **appreciate** the power of quantum computing in nature and the mind through one particular example. In the TV episode “Monk goes back to school,” Mr. Adrian Monk (a temporarily retired police detective) is frightened by the **intelligence** of a male science teacher who killed a pregnant female English teacher (his secret lover). Monk believes that the science teacher threw her from the top of a clock tower, although he was at the moment supervising the SAT exam of a group of students in a specific classroom. Monk knows that in classical reality no one can act in two places at the same time (the first principle at the left in Figure 4); and the suspected assassin shows him that a serpent in a glass container would see but could not snatch a mouse in a nearby container for it could not cross either the first or the second glass wall (a limitation born of the second principle at the left in Figure 4).

The intuition of the **meeting** of **spacetime** and **hyperspace**, however, leads Monk **serendipitously** to the solution when he faces an enemy (the father of one student he had to discipline) in front of the clock tower. Right then Monk **understands** that the assassin had placed his mangled victim on the advancing horizontal long needle of the tower’s clock, which gave him the time to return to his classroom before her body slid and fell on the top of his car parked under the clock. Once the meeting of **infinity** with **nothingness** in Monk’s mind **finds the solution** to the hideous crime, the detective thanks his puzzled enemy, who asks a witness about who had won the virtual match. Both Monk and his opponent **won simultaneously** when **creativity** replaced **violence**. Any Sacred Text and any Work of Art contain that invisible teaching, which **Hitler**, **Stalin**, and **Mao** never learned.

The example just reviewed uncovers the **justice** imposed by Monk on a **violent** science teacher who enjoyed **making fun** of the principle of classical and **quantum** computing. Unlike the **criminal creativity** in the mind of the science teacher, the **union** of **quantum** and classical computing in the mind of Monk can solve arduous problems and overcome successfully challenging incidents. In *Monk goes back to school*, **infinity** and **nothingness** court each other as they do in the expanding circular wave caused by an earthquake or by a stone thrown into the surface of a calm lake. In any circle, an **infinite number** of identical radii court the **nothingness** of a common center. A circular wave, then, reflects the **power** of the constant Greek Pi by the square of any of its infinite radiuses. Similarly, *Earth’s climatic upheavals respond hypothetically to the square of the change of its surface temperature*. For instance, the rise of 1 degree Celsius in the temperature of the lower atmosphere increases by 7 the humidity of the air that feeds the monsoon and extreme floods in India, China, and Bangladesh. In 2000, the **power** of a circular wave destroyed the gas tank of a Concorde taking off from Paris. But the circular wave of quantum computing can also **do good!**

The **circle** that inscribes the squared base of Giza’s **pyramids** suggests that ancient Egyptians knew (Cassella, 2018a) that the **going of quantum coherence** can change into the **return** to a better classical reality by way of **quantum decoherence**. (One example is the better Democracy brought by the failed effort to undo the legitimate victory of his rival in a selfish outgoing President.) The fact that in four pyramids of the fourth Egyptian dynasty (Khufu, Djedefre, Khafre, and Menkaure) the quotient of the perimeter of the base over the height results in the number **6.28** sustains my hypothesis (Cassella 2018a, 2019) that **Greek Pi** (3.14 etc.) and **Euler’s identity** ($e^{i\pi} + 1 = 0$) reflect **quantum coherence**; for example, in the **self-centered ambition** of the science teacher that tries to humiliate Monk in *Monk goes back to school*. Fortunately, **Greek Tau** (twice Greek Pi, or 6.28 etc.) and the **Tau Identity** ($e^{2i\pi} - 1 = 0$) can be linked with Monk’s **love for justice**.

There is no **justice** in forcing the young to breath an air warmer than the one breathed by Moses. That Egyptian Prince **learned** in the ancient “**House of Thot**” that the **Crook** of classical computing (Moses’s **Thummim** and Zechariah’s **Hoalim**) can **cross** the **Flail** of quantum computing (Moses’s **Urim** and Zechariah’s **No’am**) in any **enlightened leader**. An enlightened Moses devised the teachings that King Solomon passed to the Queen of Sheba, and through her to the Zhou ancestors of Laozi and to ancient Olmecs. The latter devised the myth of a **going Quetzalcoatl-Nagual** (the science teacher in *Monk goes back to school*) and a **returning Quetzalcoatl-Eagle** (Monk). Unlike



autistics, modern **tyrants** are fit to **understand** a new teaching: that Moses's **classical crystal Thummim-Crook** and his **quantum crystal Urim-Flail** were sewed for a divine reason at the **height of the heart** (a metaphor for "kindness,") in the ephod that Aaron kept in the **Ark of the Covenant**.

A same heart fed the brain of a **deceiving Jacob** in Canaan, a **dreaming Jacob** in Bethel, and a generous **Israel** in Penuel. Jacob's Vision of the **meeting** of **classical** and **quantum** computing within the Third Attention rose with **Gabriel** in Bethel; and the Third Point of an Israel's Willing to **flood others with goodness** was blessed through his fight with the Archangel **Michael** in Penuel. **Jacob's hubris** changed into **Israel's love for justice and progress** (Cassella, 2018b). Similarly, enlightened factions—as could be the USA and Russia—may **save each other** and the Earth.

Mutual enlightenment makes the meaning of Leonardo da Vinci's *Fight for the Standard* (the central piece of his mural *Battle of Anghiari*), hidden 7.035 meters below the center of Giorgio's Vasari's *Battle of Marciano* in the Hall of the 500 at Florence's Palazzo Vecchio (Cassella, 2018c). (Curious readers may see the two-parts documentary I placed in Youtube's collection and in the website researchautism.com by pressing the hyperlinks <https://youtu.be/PZUe3ELyYyg> and <https://youtu.be/et8l3ExEazU>.

4. CONCLUSION: FREEING OUR GRANDCHILDREN AND THE FIGHT FOR THE STANDARD

Earth's surface temperature will increase beyond the worst scenario manufactured by the IPCC. Increasing now the share of green fuels from 15% to 85% and halting population and economic growth will not stop the onset of global warming and its associated avalanche. While **reading** the **alliance** of **quantum** with **classical** computing in any Sacred Text and Work of Art, we have to remove the CO₂ and N₂O thrown into the atmosphere, *The alternative is to die laughing, since N₂O, or the "laughing gas," besides being 300 times stronger than CO₂, will destroy the Ozone shield.*

In my first Newsletter, I proposed that we could **use for the better** the nuclear capacity that fear and ambition **developed for the worse** during the cold war. As with the double diffraction that allowed Leif Erikson to **find the right bearing** to his Vinland through an Icelandic **crystal**, an alliance between the USA and Russia could change into sustainable Progress the inertia of the oncoming environmental and nuclear avalanches. A second step would result from uncovering three Egyptian monuments to Osiris/Orion buried south of Cairo (Cassella, 2018a).

The location of Leonardo's *Fight for the Standard*, a third step, would follow the separation of calcium carbonate from calcium sulfate plaster, at the right of the lower frame of Giorgio Vasari's *Battle of Marciano* (Cassella, 2018c) in the East Wall of the Hall of the 500 at Florence's Palazzo Vecchio. Uncovering the *Fight for the Standard* would also help us reduce Earth's surface temperature to pre-industrial values; and **Lucifer/Iblis** to escape **Satan**, as John Milton implied.

REFERENCES

- Augland, L.E., Ryabov, V.V., Vernikovskiy, V.A., Plancke, A.G., Polozov, A.G., Callegaro, S. Jerram, D.A., & Svensen, H.H. (2019). The main pulse of the Siberian Traps expanded in size and composition. *Scientific Reports* 9,18723. <https://doi.org/10.1038/s41598-019-54023-2>
- Babila, T.L., Penman, D.E., Hönish, B., Kelly, D.C., Bralower, T.J., Rosenthal, Y., & Jachos, J.C. (2018). Capturing the global signature of surface ocean acidification during the Paleocene-Eocene Thermal Maximum. *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*, 376(2130), <https://doi.org/10.1098/rsta.2017.0072>.
- Benton, M.J. (2018). Hyperthermal-driven mass extinctions: killing models during the Permian-Triassic mass extinction. *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*, 376(2130), <https://doi.org/10.1098/rsta.2017.0076>



- Bove, D., Audasso, E., Barckholtz, T., Kiss, G., & Bosio, B. (2020) Process analysis of molten carbonate fuel cells in carbon capture applications. *International Journal of Hydrogen Energy*, <https://doi.org/10.1016/j.ijhydene.2020.08.020>
- BP. (2020). *Statistical review of world energy 2020/69th edition*. London: British Petroleum.
- Caramazza, A. (1994). Parallels and ubiquities in the acquisition and dissolution of language. *Proceedings of the Royal Society of London*, 346, 121-127.
- Cassella, A. (1997). *Self-other differentiation and self-other integration from the perspective of language development and autism*. Unpublished master thesis. Harvard University. Cambridge, Massachusetts.
- Cassella, A. (2000). *Fundamentos cognitivos y semióticos de la creatividad: Aportes del autismo*. Tesis Doctoral Publicada. Universidad Nacional Experimental Simón Rodríguez (UNESR), Caracas, Venezuela. (Publicada en formato digital por Research Autism, Melbourne, Florida).
- Cassella, A. (2002). *The flameless fire: From autism to creative intelligence*. Quincy (MA): Logosresearch. (See researchautism.com or write the name "Antonio Cassella" at Amazon).
- Cassella, A. (2015). *An unlawful look at an extraordinary theory-of-everything: Answers to 15 questions concerning the dance of locality and nonlocality*. Melbourne (FL): Research Autism.
- Cassella, A. (2018a). Exploring the Sphinx and the Great Pyramid through the logos heuristics. *International Journal of Social Science Studies*, 6(9), 11-30.
- Cassella, A. (2018b). *Thus returned Quetzalcoatl: Labyrinth 1 (The way of hunting), Labyrinth 2 (The way of war), and Labyrinth 3 (The way to progress)*. Melbourne (FL): Research Autism.
- Cassella, A. (2018c). *Re-directing climate change and terrorism by allying classical computing and quantum computing*. Melbourne (FL): Research Autism.
- Cassella, A. (2019a). Joining General Relativity to Particle Physics through Complex Numbers and Autism. *International Journal of Social Science Studies*, 7(4) 33-56.
- Cassella, A. (2019b). Gaging the Neural Path of the Universal Grammar by the Logos Heuristics. *International Journal of Social Science Studies*. 7(6), 85-108.
- Foster, G.L., Pincelli, H., Lunt, D., & Zachos, J.C. (2018) Placing our current "hyperthermal" in the context of rapid climate change in our geological past. *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*, 376(2130). <https://doi.org/10.1098/rsta.2017.0086>
- Kump, L. R, Pavlov, A., & Arthur, M. A. (May 2005). "Massive release of hydrogen sulfide to the surface ocean and atmosphere during intervals of oceanic anoxia." *Geology*, 33, 397-400. <https://pdfs.semanticscholar.org/3a12/61e202e35bc643d470135eece42efdc133d0.pdf>
- Kump, L. R. (2018). Prolonged Late Permian-Early Triassic hyperthermal: failure of climate regulation? *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*, 376(2130). <https://doi.org/10.1098/rsta.2017.0078>
- IPCC-WG1. (2007). *Fourth Assessment Report. Summary for Policymakers*. IPCC-WMO.
- IPCC-WG1. (2014). *Fifth Assessment Report. Summary for Policymakers*. IPCC-WMO.
- IPCC. (2018). *Global warming of 1.5°C*. IPCC-WMO,
- IPCC. (2019). *The Ocean and Cryosphere in a Changing Climate*. IPCC-WMO, September,
- Jouzel, J. et al. (2007). Orbital and millennial Antarctic climate variability over the past 800,000 years. *Science*, Vol. 317, Issue 5839: 793-796. [DOI: 10.1126/Science.1141038](https://doi.org/10.1126/Science.1141038).
- Malanima, P. (2014). Energy in history. In M. Agnoletti and S. Neri Serneri (Eds.) *The basic environmental history* (pp. 1-29). Switzerland: Springer.
- Svensen, K.K., Frolov, S., Akmanov, G.G., & Polozov, A.G. (2018). Sills and gas generation in the Siberian Traps. *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*, 376(2130). <https://doi.org/10.1098/rsta.2017.0080>
- Ward, P. D. (October 2006). "Impact from the Deep." *Scientific American*, 295, 64-71. <https://doi.org/10.1038/scientificamerican1006-64>