

Towards Volumetric Brazilian Geography

The Geomer as a Useful Particulate Region

Richard B. Cathcart

GEOGRAPHOS, Burbank, California, USA

rbcathcart@gmail.com

Nilo Serpa

L'Académie de Bordeaux; L'Académie de Paris; Centro Universitário ICESP, Brasília; Universidade Santa Úrsula, Rio de Janeiro

Received: _20 May 2025_/ Accepted: _08 Jun 2025_ / Published: _11 Aug 2025_.

Abstract: Any application of down-to-earth Macro-Imagineering may result in speculative infrastructures, instrumented, and strategically installed at appropriate places within our Earth's cherished bioshell. The article expounds, from an open-minded Macro-Imagineering viewpoint centered specifically on Brasil, avoiding the pervasive and explanatorily superfluous "global warming" notion, on several budding futuristic techno-social approaches to our already anthropocentric [1-2], and increasingly unitary planet. It was stimulated by Brazilian quantum physicist Nilo Sylvio Costa Serpa's indicative, inspired scientific terminology: "Quantum-Imagineering" [3]. With that instigative 2019 statement in CALIBRE, it is to be hoped another useful investigative and explicative thread for academic-level taught Geography in Brasil, after Josue de Castro [(1908-1973) 4], can be commenced at once. In effect, a new "school" of Academic Geography may become established.

Keywords: Macro-Imagineering, Dosmozoicum, Geomer, Hans Carol, Social media falsehoods, Anthropogenic global warming, Quantum computation, Brazil, Guanabara Bay, Mining.

Resumo: Qualquer aplicação especulativa, porém, realista de *Macro-Imagineering* pode resultar em infraestruturas instrumentadas e estrategicamente instaladas em locais apropriados dentro da preciosa *bioshell* da Terra. O presente artigo expõe, a partir de uma perspectiva aberta de *Macro-Imagineering* centrada especificamente no Brasil, e, evitando a noção generalizada e quase supérflua de "aquecimento global", diversas abordagens tecnossociais futuristas em desenvolvimento para o nosso tão antropocêntrico [1-2] e cada vez mais unitário planeta. Foi estimulado pela terminologia científica indicativa e inspirada do físico quântico brasileiro Nilo Sylvio Costa Serpa: "Quantum-Imagineering" [3]. Com essa instigante declaração de 2019 na CALIBRE, espera-se que outra linha investigativa útil e explicativa para o ensino acadêmico de Geografia no Brasil, após Josué de Castro [(1908-1973) 4], possa ser iniciada de imediato. Com efeito, uma nova "escola" de Geografia Acadêmica pode ser estabelecida.

Palavras-chave: *Macro-Imagineering, Dosmozoicum, Geomer, Hans Carol, Falsidades nas mídias sociais, Aquecimento global antropogênico, Computação quântica, Brasil, Baía de Guanabara, Mineração.*

Dedication: to the memory of Alexander A. Bolonkin (1933-2020).



CALIBRE – Revista Brasileira de Engenharia e Física Aplicada, ISSN 2526-4192.
Livre direito de cópia de acordo com os princípios estabelecidos pela *Creative Commons*.

1. Introduction

Many of the too-vociferous personalities and famous organized groups usually identified by world-spanning electronic and print social media as “climate scientists”, as in the usual “climate scientists say...” storyline titles, have until recently actually been Flat Earth climate modelers! (“Climate Activists” mostly parrot the storylines spouted by acclaimed “climate scientists” to advance ever-more elaborated social macro-engineering schemes of so-called worldwide Crisis Management. It would seem, then, that the conveniently-adopted ersatz conventional “climate science” is today intensely focused on social media-ghettoizing its barely organized opposition, Brazil’s alleged “Deniers” as well as groups elsewhere) [5]. With uncommon candor, several honest scientists have recently unveiled an important global climate-modeling super-computing programming discrepancy: “A mostly forgotten assumption in climate models is that of a flat Earth atmosphere. Spherical atmospheres intercept $2.5 \text{ W}\cdot\text{m}^{-2}$ more sunlight and heat the climate by an additional $1.5 \text{ W}\cdot\text{m}^{-2}$ globally” [6]. In other words, all the expensive digitized super-computer read-outs and fanciful graphics, focused almost exclusively on humankind’s past carbon dioxide gas emissions, generated so far have ignored the basic fact, known from real-world Portuguese experience since the first circumnavigation of our planet hundreds of years ago, of Earth’s sphericity as well as its true placement in universal time-space! The monologues about the present-day Earth’s global and regional climate, whatever that may be in reality [7], has become a corrupted, hyperbolic popular social media topic of verbose governmental politics, intricate verbal publicized discussions (employing intentionally arcane and misleading jargon) about alleged public-policy benefits that are, relentlessly, neverendingly purveyed — nay, inflicted to the point nowadays of inducing pseudo-deafness, on too-attentive courteous Brazilian laypersons.

Since at least the mid-1960s, once normal everyday human environmental concerns — survival and increasing personal future prosperity — have been effectively shaped by elaborate but unperfected super-computer model projections of, mostly, worldwide climate regime catastrophes. From the very start of this over-arching documentation effort, the effort was outrageously irrelevant; because of the undeniable absence of reliable, long-term real-world scientific measurements from well-kept, placed, and operated weather instrumentation it only amounted generally to wasted taxpayer funding! It was a bandwagon fueled by besieged taxpayer monies, quickly boarded by those opportunists mostly intent on prolonged, well-paid careers in a vaporous “climate forecasting science” campaign that, gradually, morphed into the even more lucrative Social Engineering of Brazilians as well as other humans; briefly summarized, thundering herds of so-called “climate scientists” groomed themselves as “heroes” and, sometimes, portray themselves in popular social media as comfortably living and still working “social justice” martyrs. Such persons are not truly “bad” people, merely “scientific fashionists”, opportunistic persons who have foolishly adopted weak intellectual frameworks as hypothecators and theoreticians. None of these posing persons are another Josue de Castro. However, aware that we must earn a living and that we are virtuously anti-Big Corporations, at least in our public political stance, we now seek generous public-funding of a total-solution macro-project that could, in an instant, counter the anthropogenic as well as actual natural Global Warming of Earth’s air: pay us well to increase our planet’s gravity! Because air contains vaporous freshwater (a dilute condensable) known to be radiatively active, if Earth’s gravity [8] were somehow increased—perhaps by adding extra-terrestrial mass obtained from other parts of this Solar System—the total path length of the aerial freshwater droplets will be decreased, leading inevitably to significant reduction of our planet’s so-called Anthropogenic Greenhouse Gas Emissions Effect! (Symmetry is our primary yearning.)

Generally, most people want accurate information/data about their region’s weather, not gasping at fugitive ethereal and useless speculations about their whole planet’s air condition, globally or regionally. The innumerable warnings issued by self-described “experts” has become a Brazilian life-style improvement-hindering cacophonous chorus of nonsensical crisis constructions totally without

reference or true meaning to any Brazilian's real-world life-style preferences or on-going healthful active lives which do require some feasible 21st Century safety and comfort advancements. (For example, see the 2024 Brazil-recorded movie *Ainda Estou Aqui* or, in English, *I'm Still Here*, the true story of Eunice Paiva's survival after her dissident engineer-politician husband, Rubens Paiva, disappeared, by force of government.) Numerous such reported climate-data projections have only served those of a certain pecuniary persuasion — persons and organizations that have permitted themselves to be overwhelmed by airy hyperbolized hypotheses and mathematized gibberish but who cash corpulent pay-checks and enjoy, prospectively, very high retirement Brazilian Real and centavos perks. In fact, the impressive government and academia-housed electronic gadgetry (bought by law-enforced mandatory taxpayer contribution), along with its blabbering, publicity-seeking white-coated laboratory supercomputer modelers and their associated press-release penners, seems to thoroughly stunt the normal macro-imaginings of all who partake of its addictive drug-like social news miasma of mapped globalized and impending future disasters.

In short, "Climate Science", massaged and media-emitted by excessively fictionalized — after all, they really speak only of our "future"— social media pronouncements, remains ersatz Science stultified and sullied, shifted to an inconsequential real-world status in terms of actually learning something factually new about our macro-problem beset planet of ecosystem-nations and our entire world's actual functions. With politically strategic and tactical duress, boldly implied — not merely inferred by "Deniers" — their socially hostile wannabe intellectual masters in government and academia, yet four-dimensional thinking is still done by good persons due to, not so extraordinarily, some considerable effort of self-control as well as morality, willfulness and ethicalness, uncorrupted by erroneous flat-Earth programmatic assumptions foisted for unselective consumption by 2025 AD "climate science modelers" and their political and financial power-holding directors.

After mining at least 58,000 square kilometers of Earth's landscape [9], human civilization has reportedly constructed >150,000,000,000 m² of air-conditioned structures; fewer and fewer urbanized Brazilian taxpayers are outdoors more than 10% of their day. More air-conditioned structures are being built everywhere humans stay for extended periods of time. Exception for a few extant spaceships and some laboratory experimental pressure chambers, no natural geographical place exists anywhere that allows a perfect demarcation of indoor and outdoor environments, and especially so since the advent of mechanical ventilation during the 19th and 20th Centuries [10]. Described differently, because of humankind's technical progress, people everywhere are becoming less and less concerned by ambient regional weather regimes, whether normal or occasionally extreme in variation, and certainly of super-duper computed and scarily-advertised impending falsely futuristic Earthly climate change. The "Final Version" of the Sixth IPCC assessment report (AR6), illustrates large increases in Global Warming over those alarmist documents issued previously. Essentially, their technically and intellectually imperfect and monetarily-costly work-product, conceived and executed *after* the usual unreported Battle of Committee memberships, became one meant to predict peoples' actions founded on dramatic post-issuance notions — that is, the IPCC goal, taken from its supposedly authoritative reports on global climate's state, instructed the world-public what it ought to be and what, collectively, it should do in the real-world to ameliorate their previous misbehaviors. In other words, a continuance of falsehood-plagued "Climate Science" must be permitted resulting in a perpetuation of our tax-tormented civilization! The champagne-cork poppers at the Sixth IPCC report's presentation, with every enjoyable bottle of that delicious bubbly uncorked, release once securely-sequestered life-threatening carbon dioxide gas [11]. Most criminals usually reject the concept of "shame", don't they?

How may non-"Climate Science" persons escape the omniscient bureaucratic glare, the crass and coercive behavioral influence of those diktat-issuing self-proclaimed "experts"? We suggest that quite soon, possibly during 2025 even, individuals will be capable, with the help of artificial intelligence

empowerments and super-computer miniaturization, of modeling their own daily weather forecasts as well as, if they so choose, to model interesting future global and regional Earth climate regimes, possibly as pure family-entertainment. Microsoft's 2025-announced invention of Majorana-1, a quantum processing unit powered by a topological core designed to scale to a million q-bits on a single computer chip indicates the trend in future commercial computer operations! Most collected data need to be spatially referenced. For example, developed technology already allows open-data monitoring and prediction of local weather using TEMPEST, a commercial AI-assisted personal meteorological event-reporting system currently sold by Weatherflow. Because of the existence of the World Wide Web, the day should come — soon — when people will not any longer require for their survival and prosperity the flawed predictive work-products issued (at some significant taxpayer cost) to them by politicized climate prognosticators employed by tax-bloated governments and rogue major organizations. Fortunately, since the 1960s, it has become a given that the event-process of gathering and analyzing/synthesizing data about our Earthly surroundings is becoming exceptionally inexpensive; the extant miniaturized computers of AD 2025 make possible the materialization of reporting sensors in every objective *thing* manufactured or retro-fitted and many of those features and creatures we still habitually mention as being strictly Nature are bugged! Individual home- or work-based Brazilian “Deniers” can crowd-source future variously scaled geographical climate predictions which also may serve as family entertainment, electricized group fun, during hot summertime evenings or cold wintertime days! Even the Amazon River Basin's inhabitants, plants, and animals as well as humans must cope with occasionally “cold spells” caused by infrequent cold air-mass intrusions from the far South!

“Schools” of Geography — that is, a shared like-mindedness of theoretical spatial outlook that appears to be somewhat traditional — pervades (as elsewhere) Brasil's Academia. Of course, such shared opinion goes beyond a mere historical view on geographical thought, geosophy, as propounded in the USA during 1947 by John Kirtland Wright (1891-1969). Bruno Carvalho, in his presentation “After the Future: Scales of Belonging in the Urban Anthropocene” given before the 3-4 October 2019 “Future of Geography Conference” held at Weatherhead Center for International Affairs, Harvard University, exemplified Roberto Burle Marx as belonging to a “school” focused on urban infrastructure. However, the Brazilian geographer Milton Santos (1926-2001) has also been impressively lauded as the founder of a true “school” of theoretical geographical exposition in Brasil [12-13]. Brasil is the only ecosystem-nation in the New World whose population communicates using the language of Portugal, a *geomer* of the Old World; so, whether we are concerned by the viewpoints on theoretical urban and rural infrastructures of the *cariocas* or the *paulistas*, the means of sharing directly is an ancient and noble language! Admittedly, this essay is quasi-polemical and ought to be read in that spirit. Here, however vainly, the reader is being enticed to adopt a theoretical opinion on developing technologies as these are taking place in the discipline and which may efficiently allow its adopters to relate to the vocation of Geography and of infrastructural progressiveness for Brasil. When will the time arrive, probably sometime after 2025 AD, when exa-scale super-computations will be done anywhere in Latin America [14].

Since our shared present-day Earthly environmental trend conditions and object shapes result from Homo sapiens' [15] outlook and Nature's past imperfect infrastructural accomplishments, Brazilian futures are, therefore, going to be a unique result of humans' regionalized species realized and unrealized scientific and other equally vivid environmental dreams based on ever-changing verified knowledge about Nature commonly implemented by practical constructive and destructive predictive efficacy. We have noted the intriguing illusionary cover-art of a 2018 Spanish textbook, *Antropoceno: La política en la era humana* (Taurus: Madrid) by Manuel Arias-Maldonado which focused on a plastic bag floating in seawater that, at first apprehension, seemed to be a free-floating, orphaned iceberg. Such propagandized icebergs nowadays are often perceived by many Earthlings as truly symptomatic of a drastic effect, purely anthropogenic, of Global Warming; instead, we immediately envisioned the current pollution of Guanabara Bay next to Rio de Janeiro, Brazil, by unsightly floating plastic trash! This article attempts, in

a small way, to advance academic Geography, especially as practiced in modern-day Brasil, to a different organizational state reflected in the further practical development of. Hans Carol's region segregation theory which can be finalized in the reasonable time-space concept of his *geomer* conceptualization, becoming a regionalization technique applicable to any celestial body as well as universal time-space within our known and mysterious Universe. Stephen Salter's proposed and developing Geo-engineering technology for stratus Cloud Brightening seems to be an especially applicable example of particularization in the real-world. Even more au courant is "energy meteorology" based on individual photovoltaic panels [16]. Pixelated (digital electronics) meteorology, in effect!

Childish wannabe world-changing Geo-engineers — Salter is not ever to be construed as belonging to this class of propagandists — might chose to play an inconsequential but supposedly "rigorously scientific" board-game, *Planet*, using rolled randomized instructive, indeed God-like, dice which was first marketed worldwide on 20 April 2019; or, they could diligently study and learn comprehensively in formalized schooling, and self-examined elsewhere experiences afterwards. A lucky few might possibly be destined to become down-to-Earth macro-imagineer trainees courageously attempting to solve our world's largest feedback and optimization control macro-problem, the careful maintenance of the intact but friable Earth-bioshell! A few years ago, a distant dear friend of several decades, residing in Israel, Joseph Friedlander, penned a fascinating technology paradigm-breaking essay on a potential ore-mining technique exceeding today's superficial bio-mining R&D efforts: "What If We Get The Ability To Extract by Nanotech Rare Elements From the Bulk of the Earth?" [17]. Therein, he macro-imagined and proposed the sub-surface ground-mass' near-term future techno-purgation, by multiple 24/7/365 ecologically landscaped and macro-engineered tree-shaped installations utilizing anthropogenic poly-metal alloy nanites with the awesome capability, by incessant subterranean tunneling, to forcefully penetrate hard and unfractured country-rock (like plant roots [18]) that can then expeditiously dissolve desirable selected minerals and pump them rapidly upwards (out of the Earth-crust into the air or a container) through nano-scale pipelines (dubbed "tendrils") to assigned dedicated end-use processing and shaping commercial factories. (Precursor tiny mining machines like those envisioned by Friedlander might first appear as floating in a fluid industrial home-ground...say, cleaning the State of Rio de Janeiro's Guanabara Bay sediment floor of its various embedded toxic particles cast away by a negligent industrial complex, artfully reclassifying such fragments as valuable, mineable "urban ores".) Techno-purgation will not leave any mine wastes—the unwanted, currently uneconomic, solid, and liquid materials usually dumped at or near mine sites and which subsequently often pose considerable risks to nearby life and landscapes when stored in poorly maintained mounds and impoundments. Too, any Earth-crust changes that are located beneath Nature's normal impress of aerial erosion remain almost permanent in terms of our planet's singular Holocene Geologic Time period [19]. The anthropocentric term "extremophile" biota — that is, forms of life coping with >1.4 kbar or completing a life-cycle in temperatures ranging from ~2⁰ Celsius to ~60⁰ Celsius — shall be considered herein as a boundary-marker sometimes below the known limits of wind, oceanic turbulence and running water erosion. Wisely, Joseph Friedlander foresaw the absolute need for accurate forecast-targeting of future industry-required ores: "This tendril net would give, down to the individual...(cubic) meter, a programmable access and sensor network. Now we must imagine something like vibrational tomography that would use sound, ultrasound, or other communicable pulses to listen for and 'feel' out the atoms within reach. The analysis of the data would be a new definition of Big Data, made possibly by... [special vat-confined data-processing nanites permanently situated within discrete Earth-surface facilities]." Today, both daunting macro-problems are being addressed preliminarily. So, our rather insubstantial informational storyline seems to successfully indicate the impending likelihood that Homo sapiens, including Brazilians, could quite soon perhaps live by geographically vast currently speculative ecological Earthly infrastructures; what follows are a few focused thoughts on matter and energy not ordinarily discussed by professional quantum geographers anywhere...so far!

Since our species first existed, the Earth's bioshell has been an environment functioning more and more as an objective result of imposed human macro-imagination, as typified herein by Joseph Friedlander as well as scientific and engineering information; operating technology *is* the final and truest test of which alleged facts of science are useful during our lifetimes as well as possibly beyond. In his noteworthy 1970 Ph.D. dissertation, *The Great Drought: Northeast Brazil, 1877-1880*, Dr. R.L. Cuniff recounted the costly economic real-world effort effected in Brazil's *Sertão* region to counteract that region's natural climate regime drought conditions through the creation of enormous freshwater reservoirs which were correctly assumed to increase precipitation in the surround after freshwater's massive pooling. This geographical notion for deliberate human actions is indisputably geo-physically correct, but the result following implementation is financially unsatisfactory and generally insufficient to broadly increase the rainfall onto landscapes immediately adjacent to artificial reservoirs. In other words, Brazilians have previous experience with a faddish "Climate Science"-prompted Geo-engineering scheme that failed! However, what was clearly demonstrated is a volumetric approach to particularized ecosystem-nation geography [20].

2. World alternates or inutile idealities?

Since 20 May 2019, the basic measurement unit of all material mass, the kilogram, has been redefined by a quantum quantity, the Planck constant: nowadays a crystal-sphere of one kilogram is determined to be $2.152538397 \times 10^{25}$ atoms of silicon-28. One 70-kilogram person consists of $\sim 7 \times 10^{27}$ atoms whilst the whole Earth is comprised of $\sim 1.3 \times 10^{50}$ atoms. Thus, for each of our Earthly bioshell's presently living good or bad humans [21] — say, 7 billion moral and immoral persons in total — the planet affords, just approximately, 0.186×10^{23} atoms! Amazingly, atomic force microscopes have been employed as cinematographic instruments! The proposed chronostratigraphic unit, the "Anthropocene" has been rejected by professional geoscientists yet persists in the popular media. However, amongst scientists of many persuasions, there is a huge range of fuzzy and firm apprehensions, perceived or cloudy (sometimes imperceptible) meanings and disorganized or even unusable definitions! Since AD 1977 when the Silurian-Devonian boundary was pinned with a bronze plaque marking a Global Boundary Stratotype Section and Point, no such plaques have been located anywhere on or in the landmass or territorial off-shore seascape of South America! Radionuclides produced by atomic-bomb explosions during the twentieth-century may yet serve as the ideal marker for the start of Earth. As professionalized quantum geographers with diverse skill-sets and educational backgrounds, we find the term "Anthropocene" itself utterly redundant, more than a little anachronistic and far too politically charged to be at all useful in our everyday work-practice. In fact, the so-called stratigraphic surface that we commonly observe about us as pedestrians and vehicle-riders during the early-21st Century is merely another globalized, obviously new, *xenoconformity*, situated beneath an unknown, but nevertheless allegedly large, mass of cosmic space dust and debris as well as a rainout of fallen radioactive anthropogenic rubbish, an Earth-material geoscientific record of some profound pervasive anthropogenic alterations done to our species' only full-time celestial dwelling, the Earth [22] — but only that; some claim the Anthropocene is already evidently becoming expressed on Mars's rugged ocean-less surface by the extension of human and robotic explorations [23].

Instead, GEOGRAPHOS has usually adopted *Dosmozoicum* [24], meaning "Age of Human Life in Outer Space" as a far truer generalizing term-of-art for what is really happening to our present-day developing planetary homeland and its immediate spatial environs in this scarcely inhabited Solar System. (Indeed, "the solar basin" is the toponym for the small fraction of solar particles emitted into bound orbits, accumulating in our perceived and measured Solar System [25]; in astrophysics Earth's "sphere of influence is usually simplistically defined by Laplace's radius or Hill's radius.) The phrase "Atomic Age" was coined by the deservedly famous journalist William Leonard Laurence (1888-1977) in his 26 September 1945 *New York Times* front-page column "Drama of the Atomic Bomb Found Climax

in July 16 Test”. That old descriptive phrase laden with historical absolute legitimacy, is surely more than sufficient to accurately designate our late-Holocene *Dosmozoicum*! Wartime and peacetime fission and fusion atomic explosions have induced radioactive fallout — indeed, Elugelab Island in the South Pacific Ocean was comminuted instantaneously by Homo sapiens’ explosion of its first thermo-nuclear device on 1-2 November 1952 and, recently, radioactive anthropogenic pollution has been found by explorers in the deepest hadal depths of the world-ocean, the Mariana Trench. While recalcitrant pro-“Anthropocene” geoscientists, along with their parrot-like mass-media sycophants at this time still dominating the world news-media and politics at all appreciable levels, publicly rejoice at the prospect for perpetual use of the term “Anthropocene” and its associated terminologies and nugatory outlook — for example: “We can therefore, imagine a ‘commercially dead’ planet Earth as a possible end of the ‘Anthropocene...period” [26] — GEOGRAPHOS asserts that the controversially and highly-topicalized evidence being advanced as a sound underpinning for an Earth/Homo sapiens “Anthropocene” epoch is non-confirmatory. The likely geological fingerprint of the audaciously presented Anthropocene, while demonstrably clear, will not differ greatly in many respects from other known or projected events in the geological record [27]. Because durable quantum machines may never develop imagination [28], the technology that Joseph Friedlander proposed has formal educational implications for Brazilian Macro-Imagineering/Macro-Engineering because that missing machine skill must then prompt all humans everywhere to markedly cultivate Homo sapiens’ generally supposed unique capacities of sensing, understanding, handling, and innovating Earthly and extra-planetary alterations, either intentionally or unintentionally.

3. A mistily conceived Serpa-Cathcart world composition manipulation scheme

Someday Nilo S.C. Serpa’s future-realized and multi-planetary bioshell-deployed quantum machine cloud computing model may conveniently enable appropriately trained Homo sapiens representatives to utilize the widely-dispersed on-demand network of nanites postulated by Joseph Friedlander and others since. Although the jargon “cloud computing” has only been widely prevalent since AD 2007, Douglas F. Parkhill’s *The Challenge of the Computer Utility* (1966) outlined modern-day non-quantum cloud computing’s main elements. Certainly, cloud particulates (dust motes, freshwater droplets, ice-crystals, sand grains [29], additive manufacturing industry powder or paste ingredients), which indisputably do have measurable surfaces, are inequivalent to surface-less quantum “points” [30]. But, let us herein project a somewhat vague granular conception that may become useful in a near-term future real-world practical volumetric Brazilian Geography. GEOGRAPHOS takes its stimulus from University of Queensland, Australia, scientists who have created “Schrodinger’s Art” — visible images of live persons as well as famous oil and watercolor artist’s paintings placed onto normally unseen quantum canvases comprised of Bose-Einstein condensates, <https://www.uq.edu/news/article/2019/05/scientists-paint%E2%80%9999-mona-lisa-quantum-canvas>; their work combines the dexterous skills of artistic cartographers utilizing the “pointillism” style of Georges Seurat (1859-1891) as well as the amateur artist’s product manufactured and shop-sold by Dan Robbins (1926-2019) as his commercial popular entertainment, the “paint-by-number” amateur-aimed Art-supply store sold product! Since Earth’s innermost core — along with the shell-shaped Earth-mantle — never reached, touched or remotely-directed machine manipulated — is assumed to be an eccentric, even lumpy, possibly rotating nucleated mass, basically GEOGRAPHOS asserts that the popularized so-called “Anthropocene” is sufficiently best characterized by its anthropogenic *geomer* particulate pollution. Asteroid 2024 YR2 has a ~3% likelihood of hitting Earth in 2032 AD but won’t excessive future asteroid mining [31] also cause unlimited particulate pollution if minerals are extracted, shaped for aerodynamic delivery to Earthly customers arrive constantly?

In addition to Brazil’s heatwaves and extreme cold weather, particulate matter aerial fallout instigates the greatest human burden of respiratory, cardio-vascular, and neurological illness. Homo sapiens’ *Dosmozoicum* Earth-bioshell is most usefully segmented into suitable *geomer* vertical

volumetric units as explicated in its fullest theoretical Geography explanatory detail by Hans Carol (1915-1971) during AD 1961-62 [32]. We might try considering via volumetric thinking the Earth-bioshell as Nature's version of our laboratory "cloud chamber" investigations [33]! Indubitably Nilo S.C. Serpa's careful tentative venture into the geographical realm of "spookytechnology" [34] portends materialization of an unusual shared future biotic/robotic sentient control of the entire Earth-bioshell, with the looming possibility of a control so incontestably complete that it might equal or otherwise surpass the overwhelming active technology possessed by the fictional Krell creatures featured in the 1956 USA-made film *Forbidden Planet* [35]. One especially disgusting *Dosmozoicum* techno-social projection: what if government authorities in Brasil as well as worldwide finally modified their real-estate property taxation schemes from a taxpayer-visible basis of measured neutral surface area to a basis of calculated quantum machine network-afforded, and landscape-seascape property titled, three-dimensional *geomer* volume [36]?

For macro-engineers, ground improvement, which increasingly includes underwater sediments, entails modifying the existing physical properties of the ground undergirding the landscape or seascape to enable future effective, economic, and safe construction — that is, to achieve some condition of appropriate macro-engineering performance by densification, consolidation, injections, and in-situ surface mixing through mechanical means of the topmost non-air part of Carol's *geomer*. (The predictability limit, on average, for air's movements and changes, is now just about 15 days and that human or automated skill-set is not expected to improve significantly even with more intense use of the available as well as coming-online quantum machine cloud.) As of AD 2025, the world's smallest sensor is a <0.3 mm cube smaller than a grain of sand and grayish concrete "smart rocks" have long been employed to report on river and canal water flow effects [37]; objects enclosing Radio Frequency Identification chips nowadays pervade volumetrically enormous *geomer* segments of our planet's bioshell including the Earth-atmosphere [38]. An increasing number of in-the-field macro-engineers are carried by autonomous vehicles and oversee drones and robots, some located on offshore mining stations. Mobile material printers — really a manufacturing process contained within a movable machine — are becoming a major technology package present at big geographical-scale 21st Century construction industry worksites worldwide. For hundreds of years humans had to laboriously heft bricks of a limited size simply because of *Homo sapiens*' somewhat puny physique; that limitation is no longer a real-world necessity due to the presence and operation of drones, AI robots and material printers!

Sadly, in some instances, actual outdoor fieldwork has become unnecessary because of the virtual and augmented realities creatable electronically in any comfortable locale for any purpose! Who today can anticipate what Nilo S.C. Serpa's presciently foreseen spookytechnology will make real for Brazilians and our homeland world's populace? For sure, by cognitive off-loading and other mechanisms or devices, many persons with appropriate technologies are endowed to modify their environment to do some of their thinking for them]. Meantime, more and more frequently, GEOGRAPHOS as well as other individuals and groups have become aware of living, normal persons who became cyborgs — that is, people re-embodied by incorporating unnatural and novel material working technologies after birth into their Nature-induced gene-guided bodies [39]. The Portuguese philosopher Joaquim Pedro Oliveira Martins (1845-1894) remarked at the then astounding mentionable techno-social fact of people's tendencies towards unmonitored individual encapsulation [40]; since then, of course, humans have coped with puffed spacesuits and the tube-shaped degrading supra-structure of the truly dreary, incompletely AI robotized, about to be junked by de-orbit International Space Station.

GEOGRAPHOS envisions our Earth-biosphere will soon take on all the managerial aspects forecast by the stimulating Russian professional geographer Boris Borisovich Rodoman during the 1950s [41]. Whilst studying our immediate planetary environment from the soft matter perspective, we recalled from our long-ago school days Allen Kellogg Philbrick's malleable theoretical Geography innovation,

“...the particulate region” [42]. Philbrick (1914-2007) foresightedly devised an appropriate visualization for all macro-imagineers/macro-engineers, especially those who may have toyed with LEGO units as physiologically-unfettered children! (Grownup micro-engineer David A. Lindon, by 1 August 2024, had fabricated the world’s tiniest LEGO piece — only 0.021845 X 0.025170 millimeters—the size of a human white-blood cell.) Data and information about real-world “particulate *geomers*” will be Big Data that seem quite definitely to be fully amenable to Nilo S.C. Serpa’s futuristic quantum machines!

4. A new Serpa-Cathcart macro-imagineering archetype

Certainly, Serpa-Cathcart's world composition manipulation scheme includes the visionary perception that AI and quantum computing shall at some point be a forceful part of the macro-imagineering archetype that these authors have built over the past few years. Outside of Big Techs’ ideology, non-generative AI can play a relevant role as a predictive support tool in the strategic planning of public policies that meet the growing demand for infrastructure projects, such as the so-called “works of art” in civil engineering (AKA, public works) with macro-engineering dimensions, provided that the core algorithms of machine learning are developed specifically for each demand. Indeed, truly useful AI is that which requires heuristic proficiency in the use of multivariate statistics to create and train efficient neural networks. In a future that is still difficult to pinpoint, the complex processing of large data sets on quantum machines applying gadgets ranging from 100 to 1000 q-bits could serve AI implementations. For now, widespread and everyday quantum computing remains a remote possibility due to the significant challenges ahead. Quantum machines require a high degree of environmental isolation and high thermal control costs in order to deal with the fragility of quantum states while preserving the integrity of the information processed via q-bits. It is assumed that the increased decoherence in q-bits due to device's intrinsic noise can be controlled by advanced machine learning quantum algorithms, but any such claim at the current stage of technology would be premature.

To get an idea of the control difficulties to face, let us remember that quantum states are described by means of a vector orthonormal basis constructed in an abstract Hilbert space [3]. So, let

$$|\epsilon_1\rangle, |\epsilon_2\rangle, |\epsilon_3\rangle, \dots, |\epsilon_q\rangle$$

be that orthonormal basis. Thus,

$$\hat{\mathcal{O}}_{\vec{k}} = |\epsilon_{\vec{k}}\rangle\langle\epsilon_{\vec{k}}| \quad (1)$$

is a quantum intake of information on a screen (a “measurement”), for example. The $\hat{\mathcal{O}}_{\vec{k}}$ forms a set of operators that act upon the Hilbert phase space of the system under macroscopic interaction with \vec{k} possible results of “measurement.” The intrinsic intervention of the device modifies the initial state Ψ of the system to

$$\frac{\hat{\mathcal{O}}_{\vec{k}}|\Psi\rangle}{(\langle\Psi|\hat{\mathcal{O}}_{\vec{k}}^{\dagger}\hat{\mathcal{O}}_{\vec{k}}|\Psi\rangle)^{1/2}} = |\Psi'\rangle; \quad (2)$$

$$\frac{|\epsilon_{\vec{k}}\rangle\langle\epsilon_{\vec{k}}|\Psi\rangle}{(\langle\Psi|\hat{\mathcal{O}}_{\vec{k}}^{\dagger}\hat{\mathcal{O}}_{\vec{k}}|\Psi\rangle)^{1/2}} = |\Psi'\rangle; \quad (3)$$

$$\frac{|\epsilon_{\vec{k}}\rangle\langle\epsilon_{\vec{k}}|\Psi\rangle}{(\langle\Psi|\langle\epsilon_{\vec{k}}|\epsilon_{\vec{k}}\rangle|\epsilon_{\vec{k}}\rangle\langle\epsilon_{\vec{k}}|\Psi\rangle)^{1/2}} = |\Psi'\rangle; \quad (4)$$

$$\frac{|\epsilon_k\rangle\langle\epsilon_k|\Psi\rangle}{(\langle\Psi|\epsilon_k\rangle\langle\epsilon_k|\Psi\rangle)^{1/2}}=|\Psi'\rangle; \quad (5)$$

$$\frac{|\epsilon_k\rangle\langle\epsilon_k|\Psi\rangle}{|\langle\epsilon_k|\Psi\rangle|}=|\Psi'\rangle, \quad (6)$$

with

$$\langle\Psi|\Psi\rangle=1$$

and

$$\hat{\mathcal{O}}_k^\dagger\hat{\mathcal{O}}_k=1.$$

Due to that macroscopic intervention of the device, ϵ_k shows some classic traces inherited from that device.

However, quantum mechanics says nothing about the world out of the "measurement" — the quantum intake of information on the screen in our case —, and this constitutes a large source of uncertainty. One can imagine the size of the technical obstacle to overcome (even if we think of AI quantum algorithms sufficiently elaborate to minimize decoherence), and we have not even mentioned the possible influences of the environment external to the device.

An important observation to note is that, strictly speaking, we are not convinced of the real gains in processing capacity — considering the technological and environmental costs — of using quantum machines in coordinated large scale instead of classical supercomputers. It seems that it would be more rational to restrict the use of quantum computers, even in clouds, to macro-imaging projects capable of large physically isolated infrastructures, investing more objectively in classical computers that simulate quantum machines. Indeed, as asserted in [43]: "Geography of the future is therefore...an initiative to cross-fertilize research and epistemologies of the future". Serpa and Cathcart's new macro-imaging archetype is inevitable, but it must be thought of in terms of its sustainable applicability if we truly desire a better world.



References

- [1] Gabbott, S. and Zalasiewicz (2025) *Discarded: How Technofossils Will be Our Ultimate Legacy*. Oxford University Press) 236 pages.
- [2] Lazarus, E.D. and Goldstein, E.B. (2019) Is There a Bulldozer in your Model? *Journal of Geophysical Research: Earth Surface* 124: 696-699.
- [3] Serpa, N. (2019) "Prospects on Clouds of Quantum Machines" *CALIBRE: Revista Brasileira de Engenharia e Física Aplicada* 4" 1-25.
- [4] Davis, A. (2022) *A World Without Hunger: Josue de Castro and the History of Geography*. (Liverpool, Liverpool University Press) 256 pages.
- [5] Simpson, M. (2024) "The Scientific Case Against Net Zero: Falsifying the Greenhouse Gas Hypothesis" *Journal of Sustainable Development* 17: 137-157.

- [6] Prather, M.J. and Hsu, J.C. (24 September 2019) “A round Earth for climate models” *Proceedings of the National Academy of Sciences* [USA] 116: 19330-19335.
- [7] Bothe, O. (13 July 2018) “What even is ‘Climate’?” *Geoscience Communication Discussions*. DOI: <https://doi.org/10.5194/gc-2018-11>.
- [8] Porras, D.C. et al. (2020) “Seeing Gravity: Gait Adaptations to Visual and Physical Inclines—A Virtual Reality Study” *Frontiers in Neuroscience* 13: 1308.
- [9] Maus, K.V. et al. (2020) “A global-scale data set of mining areas” *Scientific Data* 7: 289.
- [10] Ausubel, J.H. (25 April 1991) “Does climate still matter?” *Nature* 350: 649-652. It has been carefully reported that, in some Earth-bioshell *geomers*, human body temperature has measurably decreased during the 20th Century. Could this remarkable reported metabolic change be somehow related to our commonly experienced air’s actual slight warming trend? SEE: Protsive, M et al. (7 January 2020) “Decreasing human body temperature in the United States since the industrial revolution” *eLife* 9: e49555.
- [11] Liger-Belair, G. et al. (20 September 2019) “Under-expanded supersonic CO₂ freezing jets during champagne cork popping” *Science Advances* 5: eaav5528.
- [12] Melgaco, L. (2017) “Thinking Outside the Bubble of the Global North: Introducing Milton Santos and ‘The Active Role of Geography’” *Antipodes* 49: 946-951.
- [13] Lastoria, A.C. and Papadimitriou (2012) “Geographical education in Brazil: past and present in ‘the country of the future’” *International Research in Geographical and Environmental Education* 21: 327-335.
- [14] Alexander, F. et al. (2020) “Exascale applications: skin in the game” *Philosophical Transactions A* 378: 20190056.
- [15] Yagian, A.K. et al. (2024) “Metabolic scaling, energy allocation tradeoffs, and the evolution of humans’ unique metabolism” *Proceedings of the National Academy of Sciences* 121: e2409674121.
- [16] Coimbra, C.F.M. (2025) “Energy Meteorology for the Evaluation of Solar Farm Thermal Impacts on Desert Habitats” *Advances in Atmospheric Sciences* 42: 313-326.
- [17] GOTO: https://www.nextbigfuture.com/2015/11/what-if-we-get-ability-to-extract-by_3.html. Joseph Friedlander’s posting is dated 30 November 2015.
- [18] Teodora, G.S. (9 May 2019) Specialized roots of Velloziaceae weather quartzite rock while mobilizing phosphorus using carboxylates. *Functional Biology* 33, page 76.
- [19] Peloggia, A.U.G. (2018) The Rock Cycle of the Anthropocene: Inserting Human Agency into the Earth System. *Revista do Instituto Geológico, Sao Paulo* 39: 1-13.
- [20] McNeill (2020) “The volumetric city” *Progress in Human Geography* 44: 815-831.
- [21] Torres, P. (March-April 2018) Who would destroy the world? Omnicidal agents and related phenomena. *Aggression and Violent Behavior* 39: 129-138.
- [22] Carroll, A.R. (2017) Xenoconformities and the stratigraphic record of paleoenvironmental change. *Geology* 45: 639-642.
- [23] Fairen, A.G. (March 2019) The Mars Anthropocene. *Earth & Space Science News* 100: 13-15.

- [24] Cathcart, R.B. (2018) *Macro-imagineering our Dosmozoicum*. Mauritius: LAP LAMBERT Academic Publishing. 154 pages.
- [25] Tilburg, K. Van (2021) “Stellar basins of gravitationally bound particles”, *Physics Review D* 104: 023019.
- [26] Valero, A., Agudelo, A. and Valero, A. (2011) The crepuscular planet: A model for the exhausted atmosphere and hydrosphere. *Energy* 36: 3745-3753.
- [27] Cathcart, R.B. (1983) A Megastructural End to Geologic Time. *Journal of the British Interplanetary Society* 36: 291-297.
- [28] Morton, George Ashmun (1903-1983) (February 2000) Machines with Imagination. *Proceedings of the IEEE* 88: 283.
- [29] Bridge, G. (2021) “Thinking with the grain” *Dialogues in Human Geography* 11: 302-306.
- [30] Krause, D. (2019) Does Newtonian Space Provide Identity to Quantum Systems? *Foundations of Science* 24: 197-215.
- [31] Dallas, J.A. et al. (2020) “Mining beyond earth for sustainable development: Will humanity benefit from resource extraction in outer space?” *Acta Astronautica* 167: 181-188.
- [32] Carol, H. (January 1961) “Geography of the Future”. *The Professional Geographer* XIII: 14-18. SEE also: Zur Theorie der Geographie. *Festschrift z. 60. Geburtstag V. Hans Bobek, Mitteilungen der Österreichischen Gesellschaft* 105:23-38 (1963).
- [33] Bertozzi, E. (April 2019) Establishing and Consolidating a Research Field: The Biography of the Wilson Cloud Chamber in the History of Particle Physics. *Historical Studies in the Natural Sciences* 49: 117-150.
- [34] Tahan, C. (12 October 2007) Spookytechnology and Society. GOTO: <http://arxiv.org/abs/0710.2537>. Albert Einstein (1879-1955) neologized the phrase “spooky action at a distance” in “Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?”, *Physical Review* 47: 777 (15 May 1935).
- [35] Cathcart, R.B. (2017) *Sci-Fi Macro-Imagineering*. West Conshohocken, PA: Infinity Publishing. Chapter One, pages 1-24.
- [36] Spankling, J.G. (April 2008) Owning the Center of the Earth. *UCLA Law Review* 55: 979-1040. See also: Wrigley, C. (2023) “Going deep: Excavation, collaboration and imagination at the Kola Superdeep Borehole” *EPD: Society and Space* 4: 549-567. Now, geoscientists are considering the underground as both a resource for various minerals, liquids, and gases but also as a secure place for energy storage and waste deposition. Of course, *geomer* ownership then becomes paramount!
- [37] Underwood, E. (14 December 2012) How to Build a Smarter Rock. *Science* 338: 1412-1413.
- [38] Frith, J. (2019) *A Billion Little Pieces: RFID and Infrastructures of Identification*. Cambridge: MIT Press. 336 pages.
- [39] Preester, H. De (2011) Technology and the Body: the (Im)Possibilities of Re-embodiment. *Foundations of Science* 16: 119-137.
- [40] Willdey, C. (Translator) Martins, J.P.O. (1896) *The England of To-Day*. Charing Cross Road, London: George Allen. Page 76.

- [41] Cathcart, R.B. (1997) Seeing is Believing: Planetocentric Data Display on a Spherical TV. *Journal of the British Interplanetary Society* 50: 103-104. Also, SEE: Gibney, E. (14 November 2019) “Out of Thin Air” *Nature* 575: 272-273.
- [42] Philbrick, A.K. (January 1982) Hierarchical Nodality in Geographic Time-Space. *Economic Geography* 58: 1-19.
- [43] Muller-Mahn, D. et al. (2025) “Geographies of the Future” *GEOGRAPHICA HELVETICA* 80:177-185. SEE also: Galbrath, E.D. et al. (2025) “Delineating the technosphere: definition, categorization, and characteristics” *Earth System Dynamics* 16:979-999.