AN INTRODUCTION TO THE RADIOACTIVE HYPERSENSITIVITY OF THE INTELLIGENCE DEVELOPMENT AND THE ANTHROPOLOGICAL STATISTICAL ANOMALIES.

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ABSTRACT. An Introduction to the Radioactive Hypersensitivity of the Intelligence Development and the Anthropological Statistical Anomalies. The present article enlightens a specific list of well known scientific observations and scientific facts. It also enlightens a very compact formula for the upper bound of the total number of the neural reconnections of a neural network over its whole life cycle.

1. RADIOACTIVE HYPERSENSITIVITY OF THE INTELLIGENCE DEVELOPMENT

In the present article, the most important dimensionless ratio is the dimensionless ratio of the Radioactive Hypersensitivity of the Intelligence Development:

$$(1) \qquad r_{RHID} = \frac{Annual\ Intake\ of\ Food\ Energy}{Annual\ Dose\ Rate}$$

1- For Humans: $r_{RHID} \cong \frac{2806 \times 4184 \times 365.25}{175 \times 0.453592 \times (0.25 + 0.3 + 0.45) \times 0.001} \cong 5.4 \times 10^{10}$.

2- For Ants: $r_{RHID} \cong \frac{1.14 \times 4184 \times 365.25}{7 \times 10^{-3} \times (0.25 + 0.3 + 0.45) \times 0.001} \cong 2.5 \times 10^{11}$.

It is roughly calculated for a Human of 175 pounds absorbing 2 806 calories per day from the food and absorbing $0.25\ mGy$ per year from internal radiation, $0.30\ mGy$ per year from cosmic radiation and $0.45\ mGy$ per year from terrestrial radiation. It is also roughly calculated for an Ant absorbing 1.14 calories per gram of colony and per week from the food. It is only very recently that people spend a lot of times with indoor radioactive radon gas and we exclude it from the calculation above.

That dimensionless ratio can be seen as the ratio between the organic carbon energy voluntarily used to organize matter and the ionization energy involuntarily absorbed to disorganize matter.

If the fundamental couplings of the theory of everything are chosen randomly, that dimensionless ratio r_{RHID} should be around 1 in average. Therefore, we assume that the parallel universes from the Everett theory with a dimensionless ratio r_{RHID} much smaller than 5×10^{10} does not allow the life and the intelligence development to the current level we experience. In fact, from the Anthropological Statistical Anomalies we have listed below, we rather assume that the parallel universes from the Everett theory with a dimensionless ratio r_{RHID} a little smaller than 5×10^{10} does not allow the life and the intelligence development to the current level we

experience.

At a human level, decreasing the *Daily Intake of Food Energy* or increasing the *Dose rate* does not have exactly the same effect. Decreasing the *Daily Intake of Food Energy* increases the Darwin Selection Pressure on the Human food metabolism and decreases the Darwin Selection Pressure on the Human brain function and makes the Human brain working less fast while increasing the *Dose rate* decreases the Darwin Selection Pressure on the whole Human body and make the whole Human body aging faster.

The square of the dimensionless ratio of the Radioactive Hypersensitivity of Intelligence Development r_{RHID}^2 may give some upper bound to the total number of the neural reconnections of a neural network over its whole lifetime (for Humans, we consider it takes roughly 4 months to reeducate a part of a brain until 50 years old and for Ants, we consider neurons reconnect two times in their whole lifetime):

  1- For humans: $n_{reconnect} \cong 86 \times 10^9 \times 7 \times 10^3 \times 150 = 9 \times 10^{16}$.
  2- For ants: $n_{reconnect} \cong 2.5 \times 10^5 \times 9 \times 10^3 \times 2 = 4.5 \times 10^9$.

As a guess hint, we propose the following constraint on the minimum of the dimensionless ratio :

$$(2) \qquad n_{reconnect} < r_{RHID,min}^2$$

  1- For Humans, the maximum dose rate admitted is 20 mGy/yr:
  $r_{RHID,min}^2 \cong 7 \times 10^{18}$.
  2- For Ants, the maximum dose rate admitted is 100 $mGy/hour$:
  $r_{RHID,min}^2 \cong 8 \times 10^{10}$.

For Humans, in practice, we have the relation $n_{reconnect} \cong r_{HI,min}^2/81$. And for Ants, in practice, we have the relation $n_{reconnect} \cong r_{HI,min}^2/18$.

Therefore, since Humans exist few millions years ago and Ants exists 100 millions years ago, Ants are better adapted than Humans by a factor 4.5 about with respect to the maximal total number of the neural reconnections of a neural network over its whole life time. Another reason that Ants are better adapted than Humans, with respect to that theoretical upper bound, is a shorter life cycle which minimize the interference of the integrated radioactive dose rate with the Darwin Selection Pressure.

Finally, a legitimate remark, two human brains may have twice the total number of the neural reconnections while the dimensionless ratio about the Radioactive Hypersensitivity of Intelligence Development r_{RHID} remains exactly the same. However, the total number of the neural reconnections can not be done with some neural reconnections between the two different brains. So, it is important that a neuron inside a neural network has the possibility to reconnect to every neuron of that neural network. In the case of the Human brain, it appears that only the grey matter ensure to the neurons the possibility to reconnect to a maximal number of neurons. In order to be more clever, the grey matter is wrinkled in order to have

more of it inside a fixed and finite volume.

In this article, we list all the other important dimensionless ratios coming from the Anthropological Statistical Anomalies. In fact, the dimensionless ratio about the Radioactive Hypersensitivity of Intelligence Development is a consequence of them:

01- The α coupling in the Lagrangian term $\lambda \left(\Phi^\dagger \Phi - \alpha \chi_1 \chi_2 \right)^2$:
$\alpha \cong 4.02 \times 10^{-17}$.

02- The β couping in the Lagrangian term $\left(\beta^2 \Phi^\dagger \Phi \right)^2$:
$\beta \cong 1.49 \times 10^{-30}$.

03- A 5σ anomaly in the different Hubble constant H_0 measurements from the KBC Void (Local Void).

04- 96.1% of the stars of the main sequence are lighter than the Sun. At the top of that, the luminosity of the stars, lighter than the Sun, are more sable over time than the Sun's luminosity, increasing by $+8.8\%/Gyr$.

05- The sun belong to one of the spectral class with the lowest rotation speed (4 km/s at the sun's equator) and the rotation speed of the sun is half smaller than the average of its spectral class (1.997 km/s at the sun's equator).

06- The Sun is extremely close to the galactic plane with respect to the thickness of the galactic disk. The Sun is also quiet far from the Milky Way center. Those two configurations may reduce the galactic cosmic radiation exposure of the Earth from the Milky way center.

07- The Milky Way center was almost exactly inside the ecliptic plane at the beginning of the A. afarensis evolution period (4 millions years ago about). A. afarensis is important to the understanding of human evolution because it might have been the ape-like species from which the 'true' human genus, Homo, evolved about 2.8 million years ago.

08- The Milky Way center is now almost at the southernmost of the Celestial North Pole with respect to the precession period of the Earth's axis.

09- There were 5 extinctions events between 90%-95% the last 600 millions years on Earth. Since the extinction events have an efficiency increasing with the energy involved and the extinction events are an exponential process, the energy involved in the extinction events do not differ more than 25% about. With the well know distribution size of Earth's meteorites, the probability of a such extinction event series is 5.7% about. The probability that the meteorite of the last extinction event hit a sulfur-rich gypsum site due to the relatively shallow water (less than 100 meters deep), maximizing in that way the sulfate dispersed in the atmosphere and the cooling of the climate, is also the same magnitude: 3.7%. So the total probability of that

5 extinction event series is 0.21% about.

10- The Moon's titanium isotope ratio ($^{50}Ti/^{47}Ti$) appears extremely close to the Earth's one (within 4 ppm).

11- The magnetic field of the Earth is 1000× larger about than the magnetic field of the other telluric planets of the solar system. And the supermassive black hole Sagittarius A* of the Milky Way is 675× lighter about than the supermassive Wolf-Rayet/black hole binary NGC 300 X-1 of the spiral galaxy NGC 300 at 1.939 Mpc. And the supermassive black hole Sagittarius A* of the Milky Way is 1400× lighter about than the supermassive black hole of the the Taffy spiral galaxies (UGC 12914/5) at 62 Mpc.

12- The oscillation amplitude of the Earth's obliquity is 2.4°, much smaller than the 60° oscillation amplitude of the Mars' obliquity. If the Earth's obliquity is too small, the earth is either a snow ball with too short interglacial periods or either having a warmer climate during the interglacial period with a smaller winter season. Therefore, if the Earth is not a snow ball, the tropical diseases are reaching too high latitudes and the luminosity is too low in latitudes without tropical diseases. If the Earth's obliquity is too large, either the Earth albedo is lower from the melting of the polar ice caps with a much warmer climate and with the tropical diseases at larger latitudes or either the luminosity is significantly smaller or either the atmosphere thickness is smaller with a larger cosmic radiation exposure of the Earth. To observe the current intermediate value of the mean snow/ice extent (10%), the Earth's obliquity need some fine tuning (a fine tuning of 2.4°/2 over 90° about: 1.33%).

13- We are exactly at the atmosphere evolution time where CO_2 density was higher in the past and the atmosphere temperature will be warmer in the future.

14- The Nile river is the longest river despite it is not a tropical river but rather crossing the whole Sahara desert. The most important location departure of the Nile river is the Albert lake which is almost exactly at the South of the Nile Delta: 0.1° about.

15- The Antarctica continent center is only 6° from the South Pole. Moreover, it covers 61.8% of the area inside the antarctic circle despite the much lower mean Earth continental coverage 29.1% and despite the glacial erosion is 6 times faster than rivers and landslides about. Finally, the sea cover 63.7% of the area inside the arctic circle, almost the exact opposite situation of the antarctic circle with only 3% difference.

16- Major nuclear accidents happen only in the wealthiest countries involved in the second world II: USSR, NATO, USA, Swiss and Japan. It did not happen in much poorer countries with nuclear plants like: Brazil, Argentina,

Mexico, India, Pakistan, Iran, South Africa, North Korea and China. More-over, the size of nuclear warhead stockpiles has peaked to 64 500 at exactly the year of the Chernobyl's catastrophe. Finally, The Yalta Conference (codenamed Argonaut), also known as the Crimea Conference, held 4–11 February 1945. That WWII peace agreement was only 3 months before the first nuclear bomb ever: A rehearsal was held on May 7, 1945, in which 108 short tons (96 long tons; 98 t) of high explosive spiked with radioactive isotopes were detonated. The Gadget's detonation released the explosive energy of about 25 kilotons of TNT (100 TJ).

17 The World Wide Sars-Cov-2 Pandemic has a Basic Reproduction Number R_0 large as $20 - 40$ and has still a current genetic diversity less than 0.1% even after 3 years from the initial start of that pandemic in Wuhan.

2. More details development

01 - The α coupling in the Lagrangian term $\lambda \left(\Phi^\dagger \Phi - \alpha \chi_1 \chi_2 \right)^2$:
$\alpha \cong 4.02 \times 10^{-17}$.

In order to have the life and the intelligence development on earth, the number of particles should be enough large. Therefore, α coupling should be enough small. We can note the following power law dependence for the total number of particles on Earth $N_\oplus$ and the total number of stars in the visible universe N_{stars} with respect to the α coupling:

$$\alpha = \frac{v}{c^2} \sqrt{\frac{8\pi G}{hc}} \cong 4.02116 \times 10^{-17} \tag{3}$$

$$N_\oplus \cong 5.97 \times 10^{27}/26.5 \times 6.022 \times 10^{23} \tag{4}$$

$$\cong 1.36 \times 10^{50} \tag{5}$$

$$\cong \alpha^{-3.06} \cong \alpha^{-e-1/3} \tag{6}$$

Where the mean atomic weight of Earth is $\mu_\oplus \cong 26.5 \ g/mol$ and the Earth mass is $M_\oplus = 5.97 \times 10^{27} g$.

$$N_{stars} = \frac{\pi D_{visible}^3}{6 L_\odot} \Phi^* L^* \int_0^\infty \left(\frac{L}{L^*} \right)^{\alpha^*+1} e^{-L/L^*} \frac{dL}{L^*} \tag{7}$$

$$\cong 1.59 \times 10^{22} \tag{8}$$

$$\cong \alpha^{-1.35} \cong \alpha^{-e/2} \tag{9}$$

$$\Phi^* \cong 1.6 \times 10^{-2} \ h^{-3} \ Mpc^{-3} \tag{10}$$

$$\alpha^* \cong -0.9 \tag{11}$$

$$L^* \cong 1.2 \times 10^{10} \ h^{-2} \ L_\odot \tag{12}$$

$$h = 0.674 \tag{13}$$

$$D_{visible} = 28 \ 500 \ Mpc \tag{14}$$

$$(15) \qquad \frac{H_0 h}{c^2} \sqrt{\frac{8\pi G}{hc}} \cong 1.477 \times 10^{-60} = \alpha^{-3.649}$$

$$(16) \qquad M_{Visible-Universe} \sqrt{\frac{8\pi G}{hc}} = \frac{2H_0^2 \left(1 - \Omega_\Lambda\right)}{8\pi G} \frac{\pi D_{visible}^3}{6} \sqrt{\frac{8\pi G}{hc}}$$

$$(17) \qquad \cong 7.26 \times 10^{61}$$

$$(18) \qquad \cong \alpha^{3.77}$$

Table 1 Mean atomic weight *Amean* ± SD of the whole planets and the moon, their cores and bulk silicates (BSP = mantle+crust).

Planet	Global	Core	BSP
Mercury	35.8 ± 0.5	53.5 ± 3.5	21.1 ± 0.5
Venus	25.8 ± 0.6	51.2 ± 6.6	21.1 ± 0.9
Earth	26.5 ± 0.6	50.4 ± 2.1	21.1 ± 0.1
Moon	21.8 ± 0.4	50.3 ± 3.7	21.5 ± 0.4
Mars	25.2 ± 0.1	50.9 ± 1.0	22.1 ± 0.1
Mean		*51.3 ± 1.3*	*21.4 ± 0.4*

Figure 01 -

02 - The β couping in the Lagrangian term $\left(\beta^2 \Phi^\dagger \Phi\right)^2$:
$\beta \cong 1.49 \times 10^{-30}$.

The following power law dependence of the dark energy coupling β to the α coupling:

$$(19) \qquad \beta = \left(\frac{c^2 \left(hc\right)^3}{E_P^4} \frac{3H_0^2 \Omega_\Lambda}{8\pi G} \right)^{1/4}$$

$$(20) \qquad = \left(\frac{c^2 \left(hc\right)^3 \left(8\pi G\right)^2}{\left(hc^5\right)^2} \frac{3H_0^2 \Omega_\Lambda}{8\pi G} \right)^{1/4}$$

$$(21) \qquad = \left(24\pi \frac{h}{c^5} G H_0^2 \Omega_\Lambda \right)^{1/4}$$

$$(22) \qquad \cong 1.48328 \times 10^{-30}$$

$$(23) \qquad \cong \alpha^{1.82} \cong \alpha^{2e/3}$$

If the Hubble constant H_0 is larger, or equivalently, if the dark energy coupling β is larger, the spiral galaxies would have much less secondary young stars since the secondary young stars are formed from the bombardment of the small satellite galaxies on the spiral galaxies. Indeed, the small satellite galaxies around the spiral galaxies are affected by the expansion rate of the universe (d_{M31} is the distance between the Andromeda galaxy and the Milky Way center):

$$(24) \qquad\qquad\qquad v_{Hubble} = H_0 d_{M31}$$

$$(25) \qquad\qquad\qquad \cong 73.0/1\,000\,000 \times 752\,000$$

$$(26) \qquad\qquad\qquad \cong 54.9\ km/s$$

$$(27) \qquad\qquad\qquad v_{orbit} = \sqrt{\frac{GM_{MW}}{d_{M31}}}$$

$$(28) \qquad\qquad \cong \frac{1}{1\,000}\sqrt{\frac{6.67 \times 10^{-11} \times 1.2 \times 10^{12} \times 1.99 \times 10^{30}}{752\,000 \times 3.09 \times 10^{16}}}$$

$$(29) \qquad\qquad\qquad \cong 82.8\ km/s$$

$$(30) \qquad\qquad\qquad \cong v_{Hubble}/0.663$$

We can conclude that with a larger β coupling, the spiral galaxies would have a much lower number of secondary young stars with the chemical elements necessary for the life and the intelligence development.

Figure 02 -

03 - A 5σ anomaly in the different Hubble constant H_0 measurements from the KBC Void (Local Void).

The KBC Void (Local Void) reduce the extra galactic cosmic radiation exposure of the Earth significantly (-50%) while increasing much less the local Hubble constant around the Earth:

$$(31) \qquad\qquad\qquad \frac{H_{0,\odot} - H_{0,CMB}}{H_{0,CMB}} = +8.37\%$$

Increasing a bit the local Hubble constant around the Earth reduces a bit the number of the secondary young stars from the bombardment of the small satellite galaxies on the spiral galaxies. Finally, it reduces a bit the number of secondary young stars with the chemical elements necessary for the life and the intelligence development.

Finally, The KBC Void (Local Void) should increase the probability of the life and the intelligence development roughly as the inverse of the Hubble tension: $1/(1 - P(5\sigma))$.
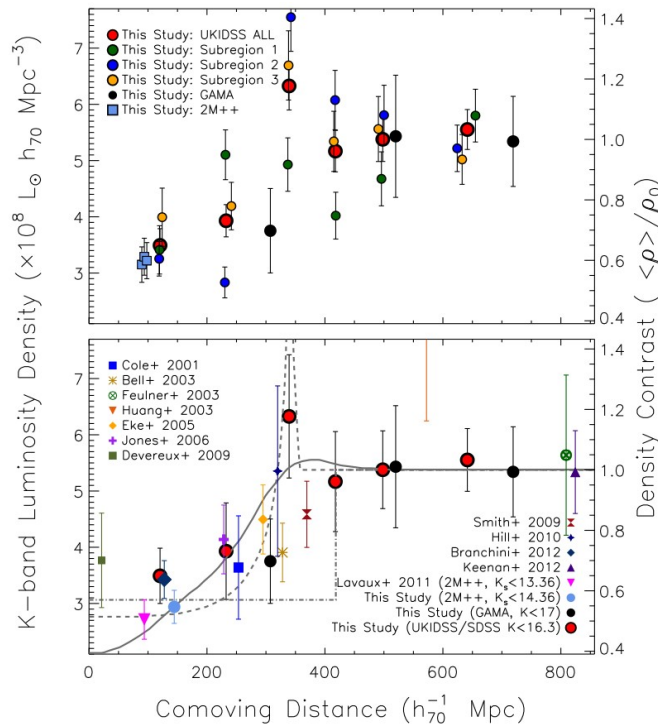

Figure 03 -

04 - 96.1% of the stars of the main sequence are lighter than the Sun. At the top of that, the luminosity of the stars, lighter than the Sun, are more sable over time than the Sun's luminosity, increasing by $+8.8\%/Gyr$.

That Anthropological Statistical Anomaly combined with a shorter time interval at a low level of CO_2, a low latitude of the tropical diseases and a low ice coverage should be compensated. Indeed, a heavier Sun have a larger escape velocity, have fewer flares and coronal mass ejections and erode less the atmosphere of the solar planets. Therefore the solar planets have a smaller exposure to the cosmic radiation. Finally, it increases the life and the intelligence development because of the Radioactive Hypersensitivity of the Intelligence Development.
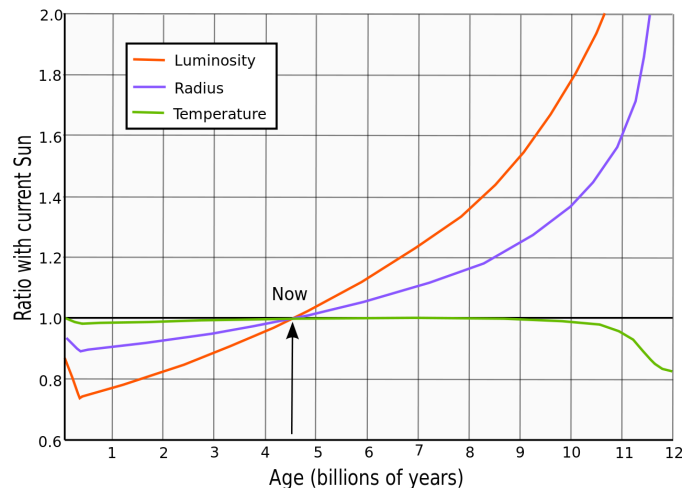
Figure 03 -

Figure 04 -

05 - The sun belong to one of the spectral class with the lowest rotation speed (4 km/s at the sun's equator) and the rotation speed of the sun is half smaller than

Class	Effective temperature[1][2]	Vega-relative chromaticity[3] [H][4]	Chromaticity (D65)[5] [K][6][4]	Main-sequence mass[7][8] (solar masses)	Main-sequence radius[7][8] (solar radii)	Main-sequence luminosity[7][8] (bolometric)	Hydrogen lines	Fraction of all main-sequence stars[9]
O	≥ 30,000 K	blue	blue	≥ 16 $M_\odot$	≥ 6.6 $R_\odot$	≥ 30,000 $L_\odot$	Weak	~0.00003%
B	10,000-30,000 K	blue white	deep blue white	2.1-16 $M_\odot$	1.8-6.6 $R_\odot$	25-30,000 $L_\odot$	Medium	0.13%
A	7,500-10,000 K	white	blue white	1.4-2.1 $M_\odot$	1.4-1.8 $R_\odot$	5-25 $L_\odot$	Strong	0.6%
F	6,000-7,500 K	yellow white	white	1.04-1.4 $M_\odot$	1.15-1.4 $R_\odot$	1.5-5 $L_\odot$	Medium	3%
G	5,200-6,000 K	yellow	yellowish white	0.8-1.04 $M_\odot$	0.96-1.15 $R_\odot$	0.6-1.5 $L_\odot$	Weak	7.6%
K	3,700-5,200 K	light orange	pale yellow orange	0.45-0.8 $M_\odot$	0.7-0.96 $R_\odot$	0.08-0.6 $L_\odot$	Very weak	12.1%
M	2,400-3,700 K	orange red	light orange red	0.08-0.45 $M_\odot$	≤ 0.7 $R_\odot$	≤ 0.08 $L_\odot$	Very weak	76.45%

Figure 04 -

the average of its spectral class (1.997 km/s at the sun's equator).

That Anthropological Statistical Anomaly should be compensated. Indeed, a slower rotating Sun have a larger escape velocity, have fewer flares and coronal mass ejections and erode less the atmosphere of the solar planets. Therefore the solar planets have a smaller exposure to the cosmic radiation. Finally, it increases the life and the intelligence development because of the Radioactive Hypersensitivity of the Intelligence Development.
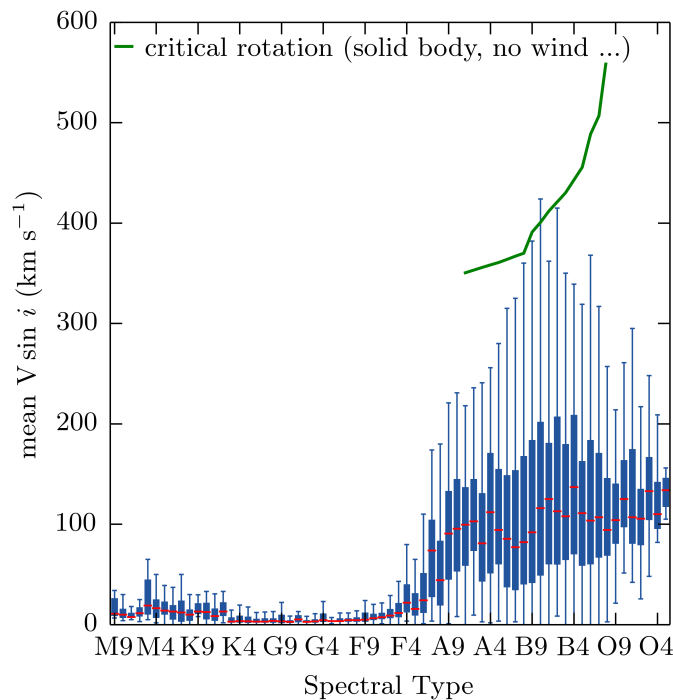
Figure 05 -

06 - The Sun is extremely close to the galactic plane with respect to the thickness of the galactic disk. The Sun is also quiet far from the Milky Way center. Those two configurations may reduce the galactic cosmic radiation exposure of the Earth from the Milky way center. Finally, it increases the life and the intelligence development because of the Radioactive Hypersensitivity of Intelligence Development.

We can calculate the corresponding probability of that Anthropological Statistical Anomaly. The probability of the Sun is more far away of the Milky Way center and more close to the galactic plane, can be calculated as follow:

$$(32) \qquad \frac{\int_{a_\odot}^{\infty} e^{-r/R_a} r\, dr}{\int_0^{\infty} re^{-r/R_a} r\, dr} \frac{\int_0^{z_\odot} e^{-z/R_h}\, dz}{\int_0^{\infty} e^{-z/R_h}\, dz}$$

$$(33) \qquad = e^{-a_\odot/R_a}\left(1 + \frac{a_\odot}{R_a}\right)\left(1 - e^{-z_\odot/R_h}\right)$$

$$(34) \qquad \cong 1.07\%$$

$$(35) \qquad R_a \cong 3\ kpc$$

$$(36) \qquad a_\odot \cong 8.32\ kpc$$

$$(37) \qquad R_h \cong 300\ pc$$

$$(38) \qquad z_\odot \cong 13.4\ pc$$

07 - The Milky Way center was almost exactly inside the ecliptic plane at the beginning of the A. afarensis evolution period (4 millions years ago about). A. afarensis is important to the understanding of human evolution because it might have been the ape-like species from which the 'true' human genus, Homo, evolved about 2.8 million years ago.

08 - The Milky Way center is now almost at the southernmost of the Celestial North Pole with respect to the precession period of the Earth's axis.

The celestial coordinates and the ecliptic coordinates of the Celestial North Pole : 00h 00m 00.00s, +89°59'59.99" and (90-23.4364)°,+090.000°.

The celestial coordinates and the ecliptic coordinates of the Galactic North Pole : 12h 51m 24.00s, +27°07'00.00" and (90-60.2027)°, -179.978°.

The celestial coordinates and the ecliptic coordinates of the Galactic Center : 17h 45m 40.04s, -29°00'28.10" and (90-95.6106)°, -93.1483°

In a Mathematica notebook, we derive the time evolution (in yr) of the angle (in degrees) between the Celestial North Pole and the Milky Way Center over the last precession period of the Earth. The precession period of the Earth's axis is about 25 771.5 yrs. We consider the Milky Way Center is almost immobile during a single precession period of the Earth's axis.

We also derive the time evolution (in Myr) of the angle (in degrees) between the North Orbital Pole and the Milky Way Center over the last galactic period of the Earth. The galactic period of the Earth is about 237.5 Myr.

The Milky Way Center is at the southernmost of the North Celestial Pole in only 225.4 yrs about which is only 0.88% of the precession period of the Earth's axis about. Therefore, the cosmic radiation exposure of the north temperate climate area is almost minimized at the present time. We consider the Milky Way Center is almost immobile during a single precession period of the Earth's axis.
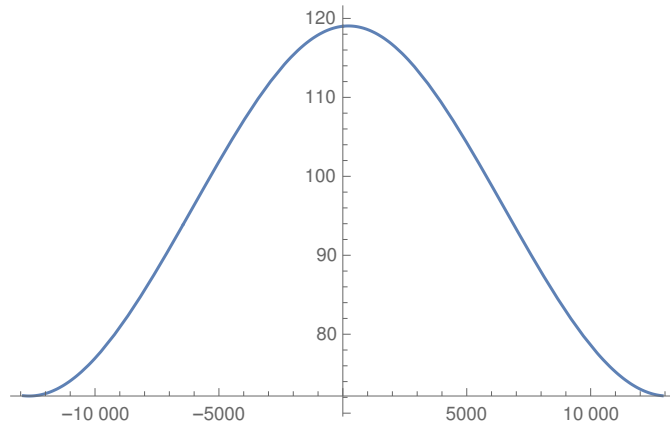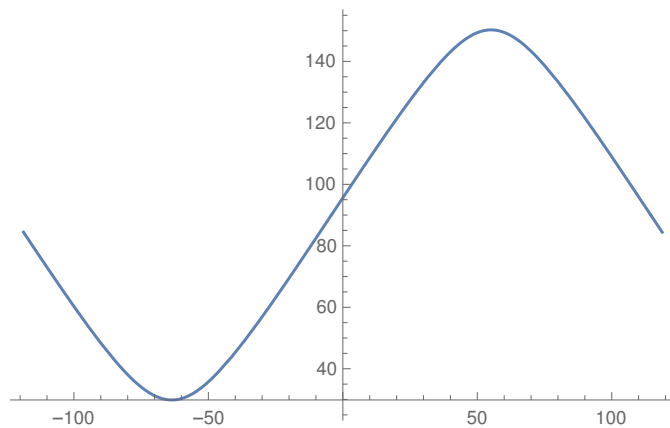
Figure 06 -

Figure 07 -

The Milk Way Center is inside the Ecliptic Plane in only -4.27 Myrs about which is only 1.80% of the galactic period of the Earth about. Therefore, the cosmic radiation exposure of the the Earth's equator is almost perfectly minimized at the beginning of the A. afarensis evolution period (4 millions years ago about). A. afarensis is important to the understanding of human evolution because it might have been the ape-like species from which the 'true' human genus, Homo, evolved about 2.8 million years ago.

09 - There were 5 extinctions events between 90%-95% the last 600 millions years on Earth. Since the extinction events have an efficiency increasing with the energy involved and the extinction events are an exponential process, the energy involved in the extinction events do not differ more than 25% about. With the well know distribution size of Earth's meteorites, the probability of a such extinction event series is 5.7% about. The probability that the meteorite of the last extinction event

Figure 07 -

hit a sulfur-rich gypsum site due to the relatively shallow water (less than 100 meters deep), maximizing in that way the sulfate dispersed in the atmosphere and the cooling of the climate, is also the same magnitude: 3.7%. So the total probability of that 5 extinction event series is 0.21% about.

The successive intermediate extinction events remove the animals unnecessarily large with respect to the maximal total number of the neural reconnections $n_{reconnect}$ constrained by the dimensionless ratio of the Radioactive Hypersensitivity of the Intelligence Development r_{RHID}. The animals unnecessarily large need a better metabolism (stronger bones, stronger muscles, stronger joints and a stronger cardiovascular system) to support a larger effective gravity. Therefore the Darwin Selection Pressure on their metabolism need to be larger and the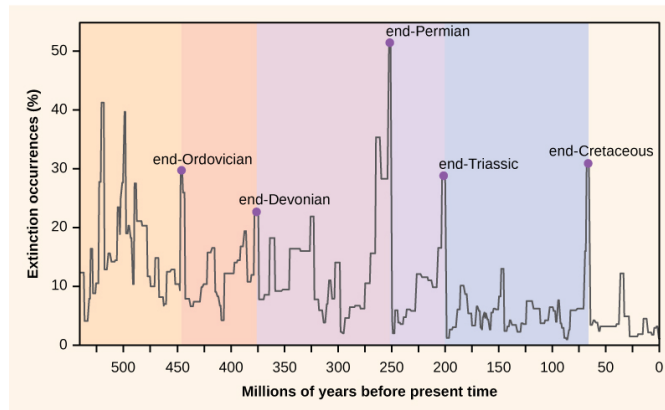 Darwin Selection Pressure on their nervous system is lower. For the animal not unnecessarily large living with unnecessarily large animals, they need to be more furtive, to run faster, to have better sensors and to have faster reactions. Therefore, the Darwin Selection Pressure on their metabolism need also to be larger and the Darwin Selection Pressure on their nervous system is lower.
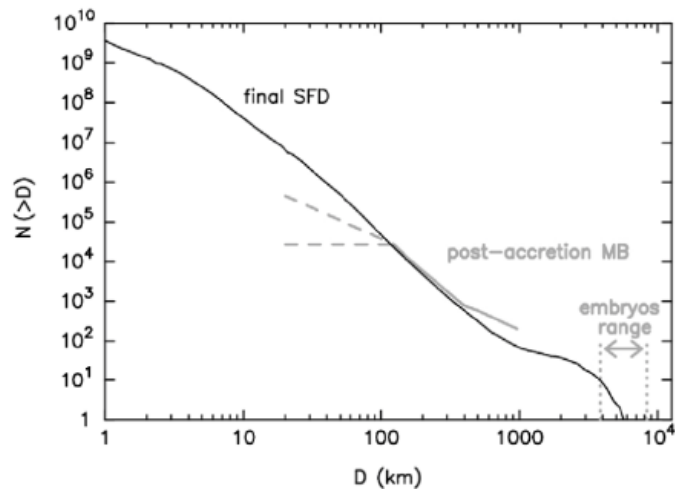

Figure 08 -

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10 - The Moon's titanium isotope ratio ($^{50}Ti/^{47}Ti$) appears extremely close to Earth's (within 4 ppm).

11 - The magnetic field of the Earth is 1000× larger about than the magnetic field of the other telluric planets of the solar system. And the supermassive black hole Sagittarius A* of the Milky Way is 675× lighter about than the supermassive Wolf-Rayet/black hole binary NGC 300 X-1 of the spiral galaxy NGC 300 at 1.939 Mpc. And the supermassive black hole Sagittarius A* of the Milky Way is 1400× lighter about than the supermassive black hole of the The Taffy spiral galaxies (UGC 12914/5) at 62 Mpc.

To explain roughly the first two observations, we suggest an Earth formation scenario where successive small meteorites hit the Earth around the equator with a large tangential speed in the direction of the Earth's rotation. In that case, after the first successive small meteorites impacting close the equator with a large tangential speed in the direction of the Earth's rotation, the rotation speed of the Earth is very large and the rocks at the Earth equator need only a very small amount of energy to reach the Low Earth Orbit. Therefore, the next successive small meteorites impacting close to the Earth's equator with a large tangential speed are able to send in Low Earth Orbit a very large amount of rock (much more than the small meteorites itself). At the end of that scenario, the rocks in the Low Earth Orbit merge into the moon with a titanium isotope ratio ($^{50}Ti/^{47}Ti$) very close to the Earth one and the magnetic field of the Earth is large since it was triggered by a large initial "seed" magnetic field from the large tidal forces between the Earth mantle rotating at large speed and the large amount of rocks in Low Earth Orbit.

That Anthropological Statistical Anomaly about the relatively very light supermassive black hole of the Milky Way should be compensated. Indeed, a relatively very light supermassive black hole of the Milky Way reduce significantly the galactic cosmic ray radiation exposure of the Earth. Therefore, it increases the life and the

intelligence development because of the Radioactive Hypersensitivity of the Intelligence Development.

12 - The oscillation amplitude of the Earth's obliquity is 2.4°, much smaller than the 60° oscillation amplitude of the Mars' obliquity. If the Earth's obliquity is too small, the earth is either a snow ball with too short interglacial periods or either having a warmer climate during the interglacial period with a smaller winter season. Therefore, if the Earth is not a snow ball, the tropical diseases are reaching too high latitudes and the luminosity is too low in latitudes without tropical diseases. If the Earth's obliquity is too large, either the Earth albedo is lower from the melting of the polar ice caps with a much warmer climate and with the tropical diseases at larger latitudes or either the luminosity is significantly smaller or either the atmosphere thickness is smaller with a larger cosmic radiation exposure of the Earth. To observe the current intermediate value of the mean snow/ice extent (10%), the Earth's obliquity need some fine tuning (a fine tuning of 2.4°/2 over 90° about: 1.33%).
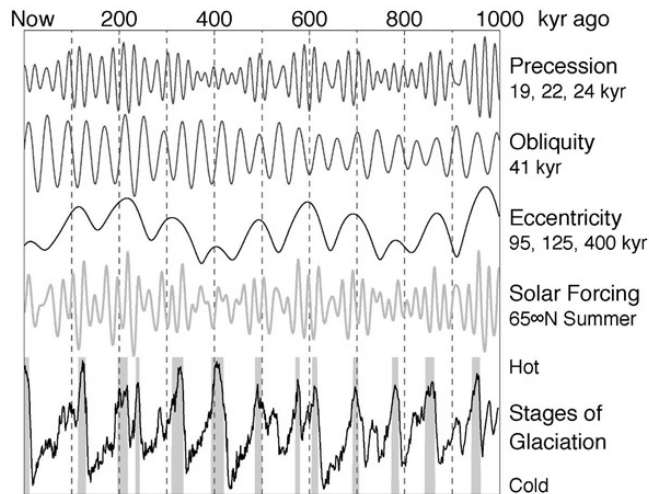

Figure 12 -

13 - We are exactly at the atmosphere evolution time where CO_2 density was higher in the past and the atmosphere temperature will be warmer in the future.

Higher level of CO_2 may induce a Respiratory Acidosis, may decrease the Ph of the human body and may reduce the immune system if the metabolism is not enough good to compensate those health issues. Therefore, the Darwin Selection Pressure on the metabolism is larger with a higher level of CO_2 and the Darwin Selection Pressure on the nervous system is lower with a higher level of CO_2.

14 - The Nile river is the longest river despite it is not a tropical river but rather a river crossing the whole Sahara desert. The most important location departure
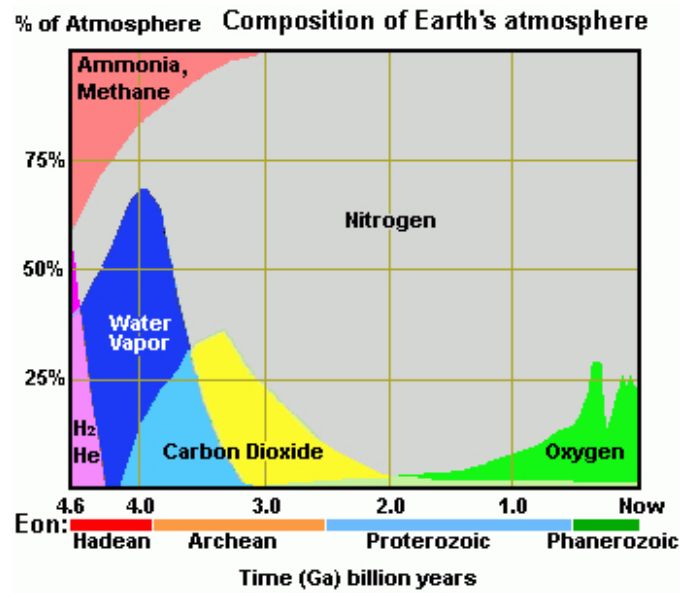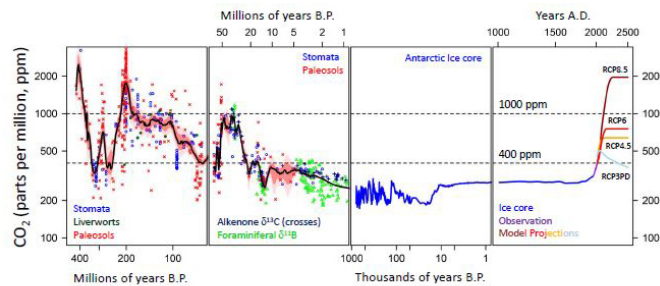
Figure 13 -

Figure 13 -

of the Nile river is the Albert lake which is almost exactly at the Southernmost of the middle of the Nile Delta: only 0.1° difference about. The White Nile provides a regular supply of water throughout the year. During April and May, when the main stream is at its lowest level, more than 80 percents of its water comes from the White Nile. The White Nile obtains its water in roughly equal amounts from two main sources.

The Humans were born in Africa because they were not enough clever yet do avoid starvation in none tropical areas. When the Humans were enough clever to avoid starvation in none tropical areas, they move to the none tropical areas via the Nile river to avoid the disabling tropical diseases. Without the Nile, that travel would be much more difficult since the deserts separate the temperate climate areas from the tropical climate areas. When the Humans will have better technologies

and better social organizations against the tropical diseases, the tropical areas will be more attractive since they have more Sun energy and more food and more wood.

Figure 14 -

15 - The Antarctica continent center is only 6° from the South Pole. Moreover, it covers 61.8% of the area inside the antarctic circle despite the much lower mean Earth continental coverage 29.1% and despite the glacial erosion is 6 times faster

than rivers and landslides about. Finally, the sea cover 63.7% of the area inside the arctic circle, almost the exact opposite situation of the antarctic circle with only 3% difference.

Without the Antarctica continent, either the tropical diseases would be at higher latitudes or either the luminosity of the Sun would be lower or either the atmosphere thickness would be smaller and the cosmic radiation exposure of the Earth would be larger. We may imagine two Antarctica continents at both poles of the Earth but the Antarctica continent precipitate massively the water vapor of its atmosphere and reduce extremely the surface of the temperate climate area of its atmosphere into cold deserts.

Figure 15 -

16 - Major nuclear accidents happen only in the wealthiest countries involved in the second world II: USSR, NATO, USA, Swiss and Japan. It did not happen in much poorer countries with nuclear plants like: Brazil, Argentina, Mexico, India, Pakistan, Iran, South Africa, North Korea and China. Moreover, the size of nuclear warhead stockpiles has peaked to 64 500 at exactly the year of the Chernobyl's catastrophe. Finally, The Yalta Conference (codenamed Argonaut), also known as
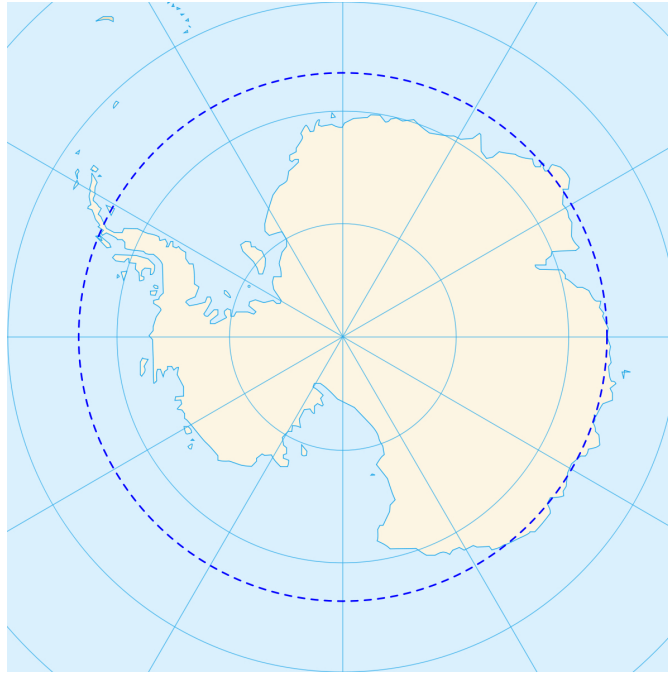
Figure 15 -

the Crimea Conference, held 4–11 February 1945. That WWII peace agreement was only 3 months before the first nuclear bomb ever: A rehearsal was held on May 7, 1945, in which 108 short tons (96 long tons; 98 t) of high explosive spiked with radioactive isotopes were detonated. The Gadget's detonation released the explosive energy of about 25 kilotons of TNT (100 TJ).

Without the Chernobyl's nuclear catastrophe, USSR may had win the Afghanistan war (Mohammad Najibullah was the president of Afghanistan until April 1992 despite the beginning of the dissolution of the Soviet Union in November 1988) and further conventional wars in Eurasia inducing a total nuclear war with USA. Moreover, the size of nuclear warhead stockpiles has peaked to 64 500 exactly at the Chernobyl's nuclear catastrophe year. The extremely powerful Duga radar (up to 30 MW) at the small Chornobyl' 2 town few kilometers away from the Chernobyl's nuclear plant may have played some role in the Chernobyl's nuclear catastrophe. Effectively, the radio wave exposure at the small Chornobyl' 2 town was extremely large (190 V/m or 9.9 mW/m^2) over the whole decade before the Chernobyl's nuclear catastrophe and may have affected strongly the health and the metabolism of the Chornobyl' 2 inhabitants. Finally, many Chornobyl' 2 inhabitants could be potentially involved in the operation of the Chernobyl's nuclear plant (at engineer level, at executive level and at military level) and negatively affect the normality and the safety of the Chernobyl's nuclear plant operation.

The graphite followers are believed to have contributed to the final moments before the Chernobyl's disaster. Inserting a control rod normally reduces the reactivity of

the core as described. However, if a rod with a follower is raised completely from the core, then when starting to insert it, the graphite follower initially adds some graphite to the core, increasing the core reactivity rather than reducing it. This triggered the final reactivity excursion at Chernobyl.

There should have been an interlock that prevented raising the control rods so far, but this was one of the interlocks that the operators had overridden in their struggle to keep the reactor at a stable low power level for the planned test at Chernobyl. Since Chernobyl, the graphite followers have been removed from the rods in the remaining RBMK reactors to prevent the possibility of this happening.

In that particular Chernobyl's nuclear catastrophe, despite the whole past and current propaganda about it, the Chernobyl's nuclear reactors were very safe (it does not exclude that the Chernobyl's nuclear reactors were less safe than other kind of nuclear reactors). The Chernobyl's nuclear catastrophe happened because at engineer level, at executive level and at military level, they planned the exact operational procedure that can induce a nuclear catastrophe at the Chernobyl's nuclear plant instead of doing their real job, that is, operating the Chernobyl's nuclear power plant as safely as possible with respect to their training and their experience.

In a more general way, nuclear catastrophes keep busy the most aggressive nuclear countries and avoid a total nuclear war. We can note that the nuclear fallout of the Chernobyl's nuclear catastrophe has impacted a maximal number of countries involved in the cold war. Finally, it is much less likely to have a total nuclear war soon after a massive conventional war. Therefore, in parallel universes where the nuclear bombs were not discovered right after a massive conventional war, it was much more likely to use them into a total nuclear war before being busy by the decontamination tasks of the nuclear fallout from a nuclear catastrophe.
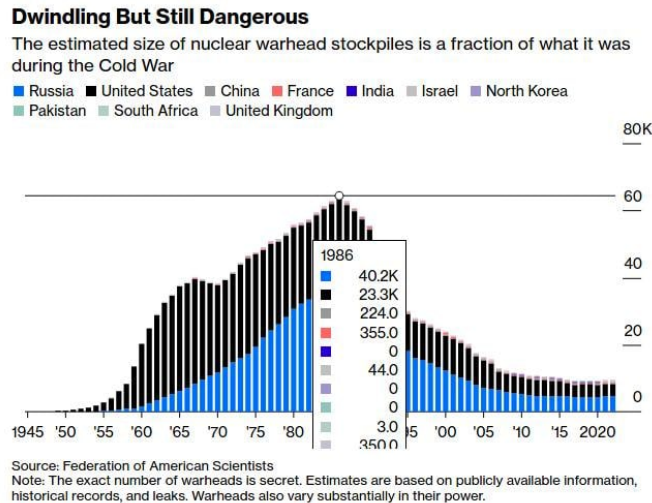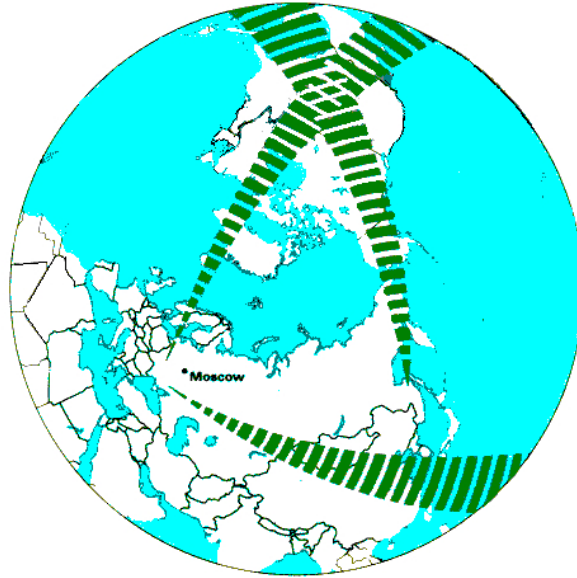

Figure 16 -

Over-the-horizon radars

Figure 16 -

Figure XI. Surface ground deposition of caesium-137 released in Europe after the Chernobyl accident [D13].
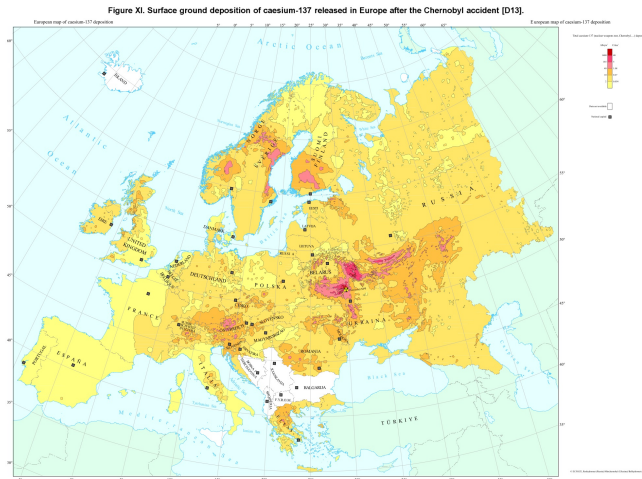
Figure 16 -

17 - The World Wide Sars-Cov-2 Pandemic has a Basic Reproduction Number R_0 large as $20 - 40$ and has still a current genetic diversity less than 0.1% even after

3 years from the initial start of that pandemic in Wuhan.

It may play a similar role than a worldwide nuclear catastrophe by keeping busy the aggressive nuclear countries in decontamination/disinfection tasks in order to avoid a total nuclear war.

Figure 17 -

3. Conclusion

We can note the following product of the probability of the life and the intelligence development:

$$P_{tot} = P_{Couplings} \times P_{Everett} \tag{39}$$

The first probability is about the different couplings of the different possible universes:

$$P_{Coupling} \approx \alpha\beta \left(hH_0 \sqrt{\frac{8\pi G}{hc^5}} \right) \cong 8.81 \times 10^{-107} \tag{40}$$

The second probability is about the Many-worlds interpretation of the different possible universes:

$$P_{Everett} \approx P_{Spiral} P_{Barred} N_{stars} \left(\bar{P} \left(Mean\ Anthropological\ Statistical\ Anomaly \right) \right)^{15} \tag{41}$$

$$\approx 0.72 \times 0.65 \times 1.59 \times 10^{22} \times (0.01)^{15} \tag{42}$$

$$\cong 7.45 \times 10^{-9} \tag{43}$$

$$\cong \alpha^{0.50} \tag{44}$$

(45)
$$\frac{P_{Everett}}{N_{starts}} \approx P_{Spiral}P_{Barred} \left(\bar{P}\left(Mean\ Anthropological\ Statistical\ Anomaly\right)\right)^{15}$$

(46)
$$\approx 0.72 \times 0.65 \times (0.01)^{15}$$

(47)
$$\cong 4.68 \times 10^{-31}$$

(48)
$$\cong \alpha^{1.85}$$

Therefore the total probability P_{tot} of the life and the intelligence development is $6.56 \times 10^{-115} \cong \alpha^{6.96}$ about (or even lower) over the parallel universes with different couplings.

Moreover, we can note that the Anthropological Statistical Anomalies in our past have a logarithm time distribution about. It means there are much more Anthropological Statistical Anomalies in the recent past than in the old past of the universe.

We can note some hierarchy between the different natural radiation expositions:

(49) $Internal\ Radiations \cong 0.25\ mSv/yr < Cosmic\ Radiations \cong 0.30\ mSv/yr$

(50)
$$Cosmic\ Radiations \cong 0.30\ mSv/yr < Terrestrial\ Radiations \cong 0.45\ mSv/yr$$

The first inequality can be explained by the relative short life time of the radioactive Potassium ^{40}K with respect to the Geologic Time Scale. Therefore, at a relatively early later stage, the internal radiation are smaller for the life and the intelligence development.

The second inequality can be explained by the role played by the radiogenic Earth's heat in the Earth's magnetic field strength. Therefore, for a larger radiogenic Earth's heat which increases the terrestrial radiation, the cosmic radiation exposure of the Earth is much lower for the life and the intelligence development thanks to a larger Earth's magnetic field strength which reduces the solar erosion of the Earth atmosphere and increases the shielding against the cosmic radiations.

Finally, the present Human specie faces two main challenges:

1- Reducing artificially the dimensionless ratio of the Radioactive Hypersensitivity of the Intelligence Development with better technologies and better societal organization. Increasing the number of artificial reconnections between the people with the help of the Internet and the technologies beyond.

2- Anticipating and detecting and preventing the next Anthropological Statistical Anomalies are crucial in order to avoid a total wiped out over a vast majority of the parallel universes in a totally painless way.
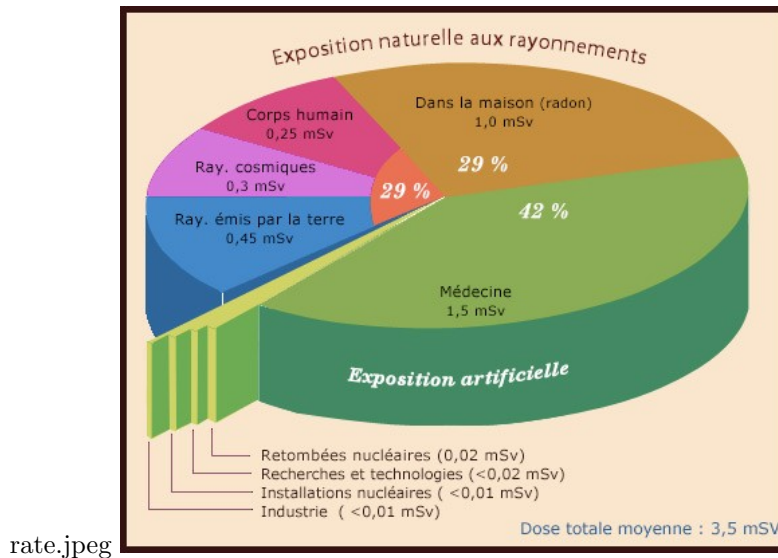
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Figure - Conclusion

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