

# SOLAR POWERED



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## Foreword

This eBook is my “Lapis Lazuli,” my life-work if I may express so. We all deserve to fully understand the reality we live in and that is my mission to the reader, to present the holistic understanding of consciousness. I share my conceptual understanding of reality and contemplative studies of consciousness based on my personal experience and contemplation, though numerous quotations and quite extensive bibliographic material serve supplementary function for strengthening personal views and perceptive contemplation. The eBook is meant for everyone who values philosophical contemplation and metaphysics.



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## PART ONE - THE VEIL OF MAYA

### World of Illusions

When eating a fruit, think of the person who planted the tree,"  
(Vietnamese proverb)

The world of illusions describes the world of matter, material world, with its own thought patterns, cosmology, civilizations and political life. It is the world representations, interpretations and challenges of the phenomena rather than the phenomena itself.

Political life is a complex description of social interactions; it is about power as well as about justice (*values*). The global political system could be described as well by the expansion of globalism, based on the balance of powers and balance of interests (*power politics, international society and world society*). Values are construed as a result of evolutionary processes of human civilizations. The values are the indicative evidence of the human political progress, but values could be manipulated or neglected, at least for the short term; nevertheless, it is the consistent part of political life, which shapes and civilizes power.

Political Power builds up on strength through transforming resources into capabilities<sup>1</sup>. Power interaction through cohesive and creative processes generates hierarchies, culture is born. Culture in Latin means cultivation, a process, a universal human capacity (*imagination and creativity*) of cultivation or improvement (*Cicero- cultivation of the soul*); and expressed in symbols (*language, customs, imposition of arbitrary forms upon the environment- fantasies, constructions*). Culture is about hierarchy and means cultivation – morals and ethics, values and beliefs; culture is the learned body of behavior, habits, customs

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<sup>1</sup>Gabriel Marcella, "National Security and The Interagency Process", chapter 17. Chas. W. Freeman, Jr., Arts of Power: Statecraft and Diplomacy, Washington: United States Institute of Peace Press, 1997, p. 3



and cumulative knowledge-history<sup>2</sup>. Culture produces and sustains society through creative processes- communication, reproduction, experience and exploration (Consensus between acceptable and unacceptable, evolving through the interactive processes of an individual within the society and between social groups and societies)<sup>3</sup>. The main defining characteristics of any society could be described in 3C cyclical process - Conflict, Control and Cooperation.

The nation is a cultural and political community (*language, history, racial and ethnical aspects, common/collective future*), and nation-state is a political organization of the nation. The nation and nation-state are interwoven, inseparable concepts: Common history, common values and common future (*goals*) for the benefit of all, the institutionalized principle of justice- ideology and economic organization. The power hierarchy at the nation-state level is based on the ideological dominance and economic organization, mysticalness is added by the religion. National identity is added on the personal identity which serves as the basis for the loyalty to the state.

The state is the formal political organization [*(in Lat.) Condition, status; political system, law-making, law-enforcement, monopoly on the use of legitimate violence (Max Weber)*]<sup>4</sup> reconciling conflicting interests of power-struggle and allocating resources (*public good*), improved norms of social interaction, system of cohabitation and developing society. State politics on other words could be defined as “Organized Cynicism” (*Who deserves to rule? /Human is led passion rather than by reason?/Inconsistency of political equality with the economic inequalities!/Power vs. Justice*). Two main aspects of the state are territoriality and sovereignty. The principle of sovereign power-rule infers the right of “legitimate” coercion with in the particular territory/people<sup>5</sup>. The legitimacy of power rule is

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<sup>2</sup>Thomas J. Czerwinski; Coping with the bounds: A Neo-Clausewitzian Primer; CCRP, USA 2008. P-216

<sup>3</sup>Victor Segesvary, “Dialogue of Civilizations – An Introduction to Civilizational Analysis”. Mikes International; Hague, Holland. 2004. pp. 13-15

<sup>4</sup>[www.wikipedia.com/state](http://www.wikipedia.com/state)

<sup>5</sup>Dialogue among Civilizations - The International Symposium on Dialogue among Cultures and Civilizations. Sana'a, Yemen, 10 to 11 February 2004. The United Nations Educational, Scientific and Cultural Organization; 7, place de Fontenoy 75352 Paris 07 SP France; 2005



dependent on two factors, on political participation and consent of a society. The sources of legitimacy vary from traditional-charismatic to democratic power-source. The traditional-charismatic power is based on the mystical, personal, emotional, psychological and institutional characteristics of control (*M. Weber 1864-1920*)<sup>6</sup>. The democratic power-source starts with the constitutionalism- “Rule of Law”, principle of checks and balances [*the declaration of Independence in 1776, followed by the American (1787) and French Constitutions (1789), though the first was Britain adopting constitution in 1688*]. The European statehood have passed developmental phases from prosperity of state sovereignty ( 1648-1789), through the period of reaction nationalism ( 1789-1914) and the period of formation and development of political ideologies ( 1914-1974) to the postmodern statehood (1992-present).

The concert of nations make up civilizations (*larger community consciousness*), which is the offspring of cross-fertilization of cultures<sup>7</sup>. Civilization is designated by the three qualifiers: cultural-historic, Religion and values; and, Geographic<sup>8</sup>. Religions serve as vehicles for transformations of civilizations; there are three definitional clusters within which civilizations take shape – culture, history and values. In particular exemplification, the Western Civilization is based on the Greco-Roman cultural heritage, Judeo-Christian Religion and the Enlightenment starting from the XVIII-XIX centuries<sup>9</sup>. The great powers believe that they have special destiny that are bearers of universal missions (*Civilization Mission, White*

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<sup>6</sup>Ibid.

<sup>7</sup>Biological evidence shows that the races differ in important ways and it is not a social construct. There are important race differences in brain size, intelligence, sexual behavior, fertility, personality, maturation, life span, crime and in family stability. There is a lot of variation within each of the three races; but still, group averages are important. For personality and IQ, genetic DNA structure dependence on heritability from the one hand, and from the other-environment varies from 40% to 70% on heredity and 60%-30% on environment. The studies show that social attitudes, criminal tendency, behavior and aggression, who we marry and who we choose friends are also partly genetic. For instance, a higher percentage of Orientals and a lower percentage of Blacks end up in the highest IQ categories; Blacks make up only about 12% of the U.S. population, each year they commit about half of all crimes (Professor J. Philippe Rushton; *RACE, EVOLUTION, AND BEHAVIOR: A Life History Perspective*; 2nd Special Abridged Edition. University of Western Ontario. London, Ontario, Canada N6A 5C2. pp 28-30)

<sup>8</sup>Victor Segesvary, “From Illusion to Delusion – Globalisation and Contradictions of Late Modernity”. Mikes International; Hague, Holland. 2004

<sup>9</sup>Youssef Al-Qaradawi, *Islam, the Civilization of the Future*, p. 15, Wahba Library, Cairo, 1995



*Man's burden, Spread of democracy*), which is the cause as well as tool of their expansionary politics. From the other point the great nations and civilizations are also the part of the greater one – the human civilization, so thus by fulfilling their missionaries they are embedding the entire human civilization with its own special destiny.

The special destiny or the special mission of human civilization from the evolutionary perspective could be highlighted as the strife for harmony and integrity of development and justice. Soul, philosophical soul, is the highest possible ideal for human development, an expression of the authentic self.

## Knowledge of the Mask

“The skill of writing is to create a context in which other people can think,”  
Edwin Schlossberg

Ideology is a comprehensive vision, comprising worldview, a way of looking things, belief systems and values; ideologies in certain sense represent science of ideas, a relativistic intellectual strategy for categorizing the world which guides human power over cognition, evaluation and action. Ideologies mainly are culturally conscious and bear class interests. Power is efficient when it promotes society's advancement in knowledge, science and culture. Ideology always serves for power interests tying inequality and power, manipulating with the information with various generalization techniques and thought and belief systems, with the goal- state of society under continuous control<sup>10</sup>. Power can be creative as well as coercive, the ideology in function is that it gives a distorted understanding of social world in certain crucial ways that mislead, distort, and give a false sense of freedom; value gradation in the scientific dogmatic system also contributes to sustaining oppressive and exploitative social relations <sup>11</sup>.

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<sup>10</sup>Alexander, J. C. *Civil Society between Difference and Solidarity Rethinking Integration the Fragmented Public Sphere*. *Theoria: A Journal of Social and Political Theory*, 1998. pp.92, 1-14

<sup>11</sup>Chandra Kumar, Foucault and Rorty on Truth and Ideology: A Pragmatist View from the Left. *Contemporary Pragmatism*; Editions Rodopi. Vol. 2, No. 1; June 2005. pp.35–93



Friedrich Nietzsche ( 1844-1900) reductions everything to power, the values are expression of will to power<sup>12</sup>, “Life is will to power”- power is the ultimate “value”, power dictates morals, truths and all other values. Karl Marx thought that there are no objective truths or eternal principles of morality, ruling ideas and norms constitute a delusive mask upon the face of the dominant class, shown to the exploited as a standard of conduct, partly to varnish, partly to provide moral support for domination; Marx thought that economic power lies at the roots of political power, those who control means of economic production, directly or indirectly, control the means of mental production. These include “the major institutions that educate and indoctrinate young people, acquire and transfer knowledge, and articulate and mould popular opinion, as well as the physical resources those institutions utilize” (Shaw 1989, 433)<sup>13</sup>.

The power rules and directs its interests by the institutions of (*organized*) religion, education, publicity and law enforcement. Although, religion provided a noble ideal capable of eliciting the best in humankind, fostering social unity, moral virtue (*righteousness and goodness*) and sacrifice on behalf of a transcendent good beyond mere self-interest and materialism; religious ideologies of fundamentalism and conservatism, with its dogmatic belief systems; and, and its politico-institutional organizations represent the compromised (*warped*) form of moral authority, which is the part of a wider political meta-theory (*ideology*) sanctifying the inequality of wealth in the capitalist social construction; serving as an instrument of rich and powerful ruling institutions. The both, theocratic politics and materialistic ideologies equally strip humanity of its transcendence. Religious ideology, serving the same purpose crafts the false-consciousness which usually

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<sup>12</sup>Michael Lacewing, Nietzsche's 'histories' of morality. Routledge, Taylor & Francis Group

<sup>13</sup>Christian Hacke on the Legacy of Hans J. Morgenthau. Power and Morality. Hans J. Morgenthau, Quoted in: Christoph Rohde, Hans J. Morgenthau und der weltpolitische Realismus, Verlag für Sozialwissenschaften, Wiesbaden 2004, p. 300



functions to legitimize a hierarchical social order, is not simply imposed by oppression but constructed by the beliefs and hopes<sup>14</sup>.

Ideologies are unable to give a coherent, all-embracing picture of the world. As instruments of manipulation, ideologies exist in concrete historical forms and represent worldviews designed to arouse the energies of people in order to inspire actions related to the achievement of the envisaged objectives (*like Marxism, or various types nationalisms*)<sup>15</sup>: Liberalism postulates that the human as an individual is more valuable than an entire society; highlights human rights and fundamental freedoms, equality, tolerance<sup>16</sup>, social consensus and constitutionalism; Liberalism had formed with the influence of Protestantism. Conservatism postulates that the human as individual is selfish, greedy and morally weak; Conservatism emphasizes on tradition, pragmatism, hierarchy, property rights, nation and state, power and authority (*authority must be gained by experience and education; society which does not recognize authority is degrading*); Socialism postulates on society, fraternity and equality<sup>17</sup>.

Ideology is about reality construction, manufacturing the “truths”, which has two crucial components: Emancipatory and Expansionary components. The emancipatory component of ideology is attitudinal; it aims at the mind, thinking processes and morals. The expansionary component is systemic; it aims at the organization of power and justice. For example, Capitalism represents emancipatory component of ideology, which is based on “strong individualism” and which enslaves with the myth of success. The hegemonic dominance is achieved

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<sup>14</sup>New Bible Dictionary, Second Edition, Tyndale House, 1982. pp. 526-527; BD Sommer, Introduction to Isaiah and Annotated Commentary, The Jewish Study Bible, Oxford University Press; 2004. pp. 780-784, p. 867

<sup>15</sup> Victor Segesvary, “Dialogue of Civilizations – An Introduction to Civilizational Analysis”. Mikes International; Hague, Holland. 2004. pp. 16-17

<sup>16</sup>Five Evils (Report submitted in the GB’s Parliament in 1942): Hardship, Ignorance, Idleness, Lavishness and Illness. Andrew Heywood; Politics – Second Edition; Palgrave. 2002. pp. 50-60

<sup>17</sup>Benjamin Disraeli (1804-1881) introduced the doctrine of “Paternalistic” Conservatism, to avoid further differentiation between aristocratic and working classes. Nowadays, he GB’s reformed conservatism is represented by the Tory; Ibid. pp 60-65



through the cultivation of consent to a given social order<sup>18</sup>- “Before you can make a man do as you say, you must make him believe what you say<sup>19</sup>”. The false identity of the general and the particular is the basis on which technology acquires power over society, the power of those whose economic hold over society is greatest. The ideology of capitalist system dictates obedience to the social hierarchy. The deceitful exposure of the objects of desire and seduction, cultivation of imitation, the culture which does not sublimate it represses. The harmony is a caricature of solidarity, which makes laughter the instrument of the fraud practiced on happiness<sup>20</sup>. Capitalism represents Social-Darwinistic approach to the wealth redistribution by supporting monopoly of power held by elites- despiritualization of human beings and transforming them into materialistic beings in with the highest ideal of wealth accumulation. John Franklin D. Roosevelt on the perils of synthesis of democracy with capitalism reflected the following, “The first truth is that the liberty of a democracy is not safe if the people tolerate the growth of private power to a point where it becomes stronger than their democratic state itself. That, in its essence, is fascism (Elite-Rule) — ownership of government by an individual, by a group, or by any other controlling private power (*April 29, 1938*)<sup>21</sup>.” Elitism is sacralization of power through totalitarian methods, which disdains equality and is described by the contempt for the weak, selective pluralism, resentment of mass democracy, militarism and imperialism; correctly described by John Maynard Keynes as “the most wickedest of men committing the most wickedest of things for the greatest good of everyone<sup>22</sup>.” Elites in capitalism, the same as power elites, comprise political, economic and military privileged circles having exclusive

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<sup>18</sup>Michael Carlberg, “Discourse on Culture;” Communications. 2004

<sup>19</sup>Daniel Lerner. Psychological Warfare Against Nazi Germany: The Sykewar Campaign, D-Day to VE-Day; (1949). George W. Stewart, New York; Reprinted by MIT Press; 1971

<sup>20</sup>Theodor Adorno & Max Horkheimer, “The culture industry: enlightenment as mass deception” (1944); Dialectic of Enlightenment, New York: Continuum,1993

<sup>21</sup>Franklin D. Roosevelt, "Appendix A: Message from the President of the United States Transmitting Recommendations Relative to the Strengthening and Enforcement of Anti-trust Laws",The American Economic Review, Vol. 32, No. 2, Part 2, Supplement, Papers Relating to the Temporary National Economic Committee (Jun., 1942), pp. 119-128

<sup>22</sup>D. Beinhocker, “The Origin of Wealth: Evolution, Complexity, and the Radical Remaking of Economics,” Eric Harvard Business Press, 2006. p- 408



monopoly on institutional power. Elites rule and manipulate masses through the systemic totalitarian and communitarian synthesis of corporatism.

The expansionary component of ideology is imperialism. The expansionary component of ideology is based on the following pillars: Cultural Superiority<sup>23</sup>; Scientific Domination-"pursuit of power through the pursuit of knowledge"<sup>24</sup>, and Security System-Construction Models. It supports the creation and maintenance of an unequal economic, cultural and territorial relationship, based on domination and subordination.<sup>25</sup> Any state engaged in expanding its power is pursuing a "policy of imperialism," wrote Morgenthau<sup>26</sup>. The Empire produces its ethical truths, to rule over an exception exercising hegemony over juridical-political practices (*ex. The right of intervention in the UN Charter*)<sup>27</sup>; the transformation processes of the world of states into an open space of imperial sovereignty<sup>28</sup>. Through political or military means (*direct imperialism*), the imperial power may take over the government of a particular territory, or through economic processes (indirect imperialism), in which the concerned region is officially self-governing but linked to the imperial power by (*often unequal*) trade relations. Furthermore, the notion of cultural imperialism is indicated by "existing or traditional ways of life and ways of thinking that are subordinated to the hegemonic culture"<sup>29</sup>. The global political system is characterized by the rivalry of ideologies for hegemony and domination

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<sup>23</sup>Terms such as "media imperialism", "structural imperialism", "cultural dependency and domination", "cultural synchronization", "electronic colonialism", "ideological imperialism", and "economic imperialism" have all been used to describe the same basic notion of cultural imperialism (Downing,, John; Ali Mohammadi, Annabelle Sreberny-Mohammadi. *Questioning the media: a critical introduction* (2, illustrated ed.). SAGE; 1995)

<sup>24</sup>D. Bell, D. "Beware of false prophets: biology, human nature and the future of International Relations theory". *International Affairs* 82 (3): pp. 493–510. 2006. A.R. Peacocke, *Theology for a Scientific Age: Being and Becoming-Natural, Divine and Human*. Augsburg Fortress Publishers; Enl Sub edition. 1993. P. Wilmshurst "Scientific imperialism". *BMJ* 314 (7084): 840–1. March, 1997.

<http://www.bmj.com/cgi/content/full/314/7084/840>.

J. Dupré, "Against Scientific Imperialism", *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1994. pp. 374–381. <http://cogprints.org/342/>.

<sup>25</sup>John Johnston, Ronald, *The Dictionary of Human Geography*; (4th ed.). Wiley-Blackwell. 200; p-375.

<sup>26</sup>Michael G. Roskin; *NATIONAL INTEREST: FROM ABSTRACTION TO STRATEGY*. Strategic Studies Institute. May 20, 1994

<sup>27</sup>Michael Hardt, Antonio Negri; *Empire*. Harvard University Press. London, England.2000. p-17

<sup>28</sup>*ibid*.p-182

<sup>29</sup>J. Painter, J. & A. Jeffrey, *Political Geography* 2nd ed., Sage. 2009. P-170.



(*ex. economic and cultural imperialism*). Contemporary global political system is characterized by the rivalry of Neoliberal Globalism and Social Democratic Liberalism (*E. Bernstein defined socialism as "organized liberalism"<sup>30</sup>*). Although both, Neoliberal Globalism and Social Democratic Liberalism see the history in the context of race-class struggle, Neoliberal Globalism aims at elevating global elites as new race while Social Democratic Liberalism aims at eliminating race and class differences through progressive integration of human civilization.

## Ego-civilization

"The problem is that ego can convert anything to its own use, even spirituality."  
Chogyam Trungpa <sup>31</sup>

Reason is the capacity human beings have to make sense of things, to establish and verify facts, and to change or justify practices, institutions, and beliefs. The reason aims at increasing intelligence and power. Power stands on ideological principle of supremacy; ideology is a servant of power and here are two cases presented- Totalitarianism and Ego-civilization:

"It is an old strategy of tyrants to delude their victims into fighting their battles for them<sup>32</sup> (*Franklin D. Roosevelt*),"- Totalitarianism is the blend of party dictatorship with state power. State power associated with absolute power is Despotism- as a form of government despotism is exercised by an autocrat, autocracy, or oligarchy. Despotism also implies tyrannical rule- dominance through threat of punishment and violence<sup>33</sup>. Totalitarian democracy means manipulation of general will and majority rule, by the political, economic and military elites. Totalitarian democracy is also defined as totalitarian oligarchy, or inverted totalitarianism. Corporations in such systems of government represent totalitarian

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<sup>30</sup>Manfred B. Steger. *The Quest for Evolutionary Socialism*. Cambridge, England, UK: Cambridge University Press, 2006. p- 146

<sup>31</sup><http://quotes.justdharma.com/tricky-ego/>

<sup>32</sup><http://www.quoteswave.com/picture-quotes/438578#B8wWcFgPvbm5fd0S.99>

<sup>33</sup><http://en.wikipedia.org/wiki/Despotism>



entities, and the state aims to enforce on the populace ideological uniformity and obedience<sup>34</sup>. Democracy represents a “Noble Lie” which allows elites to consolidate and control the society by creating an illusion of common space, associated with the terms of freedom, equality, rule of law and human rights.

Ego-civilization is a term referring societies with unequal allocations of wealth and power, conditions of inequality create ideologies of manipulation, which confuse people about their true aspirations, loyalties, and purposes; ideologies appear to explain and justify the current distribution of wealth and power in a society, present these inequalities as acceptable, virtuous, inevitable, and so forth. Ideologies thus tend to lead people to accept the status quo. The subordinate people come to believe in their subordination. Instead of literally thinking for themselves, they think the thoughts given to them by the ruling class.

Ego-civilization unites in itself imperialism, capitalism, racism, state, institutional-hierarchic systems, including religious institutions. Central intelligence community, the same as security state, represents over-class build up above the law, based on corporate principles and aim at installing the tight-wing informal dictatorships and tyranny all over the world (“Since I entered politics, I have chiefly had men’s views confided to me privately. Some of the biggest men in the United States, in the field of commerce and manufacture, are afraid of something. They know that there is a power somewhere so organized, so subtle, so watchful, so interlocked, so complete, so pervasive, the better not to speak above their breath when they speak in condemnation of it.”-Woodrow Wilson<sup>35</sup>). The phrases like “National Interest” and “National Security” are devoid of their true meaning, because the both, interests and security, concern elites and not the majority of masses (Experience declares that man is the only animal which devours his own-kind, for I can apply no milder term to the general prey of the rich on the poor;”

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<sup>34</sup>[http://en.wikipedia.org/wiki/Totalitarian\\_Democracy](http://en.wikipedia.org/wiki/Totalitarian_Democracy)

<sup>35</sup>[http://en.wikiquote.org/wiki/Woodrow\\_Wilson](http://en.wikiquote.org/wiki/Woodrow_Wilson)



Thomas Jefferson<sup>36</sup>). Security state (Deception is a state of mind and the mind of state," J.J. Angleton<sup>37</sup>) has its own unwritten laws for keeping secrets out of public view: admit nothing, deny everything and make counter accusations.

Ego-civilization is the final phase of human civilization, as we often call it- "The end of times" or "The ideology of last man", is the age of universal deceit and amoral society, the age of totalitarian government with the ideology of dehumanization (War is peace, freedom is slavery, ignorance is strength.- George Orwell), whereas political language is the language of insincerity (Political language is designed to make lies sound truthful and murder respectable, and to give an appearance of solidity to pure wind.- G. Orwell<sup>38</sup>). The ideology of last man could be described by the denial of objective truth and objective morality. Only inner party power-classes (elites) are treated as humans, the rest of the mass as- the herd, or slaves; lack of morality is the sign of superiority. Tyranny of power is the power which dictates morals- power for its own cause.

## Flying Carpet

"There is nothing more deceptive than an obvious fact," Arthur Conan Doyle<sup>39</sup>

Physics so far has uncovered four universal forces: Electromagnetism, which holds molecules together by sharing photons and elementary particles- Gravity, which holds planets; Strong Nuclear Force, which holds nucleus and Weak Nuclear Force, which holds neutron.

The matter is the consequence of the dual wave-particle aspect- "quantum effect"; mass is nothing but a form of energy. This dual nature is also inhibited by light which can take the form of electromagnetic waves or of particles (*The light*

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<sup>36</sup>Thomas Jefferson to Edward Carrington: 16, Jan; 1787. papers 11: 48-49. [www.press-pubs.uchicago.edu/faunders/documents/amendl\\_speechs8.html](http://www.press-pubs.uchicago.edu/faunders/documents/amendl_speechs8.html)

<sup>37</sup>[http://en.wikiquote.org/wiki/James\\_Jesus\\_Angleton](http://en.wikiquote.org/wiki/James_Jesus_Angleton)

<sup>38</sup>[https://en.wikiquote.org/wiki/George\\_Orwell](https://en.wikiquote.org/wiki/George_Orwell)

<sup>39</sup>[https://en.wikiquote.org/wiki/Arthur\\_Conan\\_Doyle](https://en.wikiquote.org/wiki/Arthur_Conan_Doyle)



*particles quanta – “Photons” are mass-less and travel with the speed of light*). The diameter of an atom is about 1/100 million of a centimeter, while the atomic nucleus is about 1/100 000 than the whole atom. The number of electrons and protons and neutrons determine the chemical properties of matter. The particle confinement with the nucleus in an atom produces enormous whirling velocities (*electrons race about 600 miles per-second, while protons and neutrons race in the nucleus with velocities of about 40 000 miles per-second*), and the tighter the electrons are bound with the nucleus by the electric forces higher the velocities and an atom appears as a rigid sphere which explains the solid aspect of matter. However, the atomic orbits are very different from those of the macrocosm; the difference is in the wave nature of the electrons- in such orbits electron waves have to be arranged in such a way that their ends meet to patterns<sup>40</sup>.

The universe may be viewed as a hierarchical structure of galaxies, clusters of galaxies and super-clusters of galaxies. The number of galaxies in a particular cluster may be quite low, but can be as high as a few thousand. As far as astronomers can tell, there are probably millions of black holes in our Milky Way Galaxy alone, but only one super-massive black hole right in the center, tipping the cosmic scales at 4 million times the mass of the Sun<sup>41</sup>. Astronomers counted only about 4 million galaxies. But, by rough estimation in the entire sky deep field there are more than 50 billion galaxies. Although large galaxies contain at least 100 ( $10^{11}$ ) billion stars and stretch about 100 000 light-years or more of space, they are not the biggest things in the Universe. The Milky Way is a home for at least 200 billion other stars and their planets. Just as stars are part of galaxies, galaxies are part of larger structures. Many galaxies are members of groups containing a few dozen to a hundred galaxies, or even larger assemblages known as clusters, containing several thousand galaxies. Clusters of galaxies are part of even larger super-clusters, containing dozens of clusters spread out over 100 million light-

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<sup>40</sup>Pascual Jordan Quoted by M. Jammer, *Philosophy of Quantum Mechanics*, Wiley, New York.1974. p.151

<sup>41</sup>Philip Plait. “Black Holes: From Here to Infinity” was developed as part of the NASA EXIST and GLAST Education and Public Outreach (E/PO) Programs at Sonoma State University, CA under the direction of Professor Lynn Cominsky



years of space.<sup>42</sup> Beyond these it is just black, there just doesn't seem to be anything, not even heat, beyond such a distance. Nothing. Not even empty space. It is as if existence itself simply stops out there. The hypothesis of the unity of science has certain validity, the study of the very large leads to the study of the very small (*Quantum & Cosmos*)<sup>43</sup>.

The galaxies are moving through the cosmos at approximately 100 miles/sec, the sun traverses the galaxy at 200 miles/sec and takes about 226 million years for the solar system to make one round of the Milky Way galaxy; The Earth orbits around the Sun with the speed 100 000 km/h (*20 miles/sec.*); the Earth's rotation speed around its axis is 1 000 km/h. In our galaxy/Milky Way galaxy stars are moving randomly relative to each other with the average speed 70 000 km/h. Earth's precession was historically called the precession of the equinoxes, the orientation of the Earth's axis and equator are not fixed in space and is due mostly to the gravitational effect of the Sun and Moon, rotation about the poles of ecliptics takes a period of about 26,000 years (*Great year*)<sup>44</sup>. The hottest stars in the night sky shine with a bluish colour and have temperatures in the range of 30,000–60,000 °C. The surface temperature of the central white dwarf is about 120 000 degrees Celsius. Motion speed within the local reaches 300 000 km/h, that is the speed the Andromeda galaxy and Milky Way galaxy are moving towards each other.

The sun lies about 28,000 light years from the center of the galaxy. At its widest point, the galaxy's width is about 100,000 light years. Let us shrink the entire solar system so that it has a size comparable to that of a typical grain of sand (*Recall that the solar system's actual size is about six billion kilometers*). The nearest star, Proxima Centauri, would now be just over one meter away from the edge of the solar system. The distance from the solar system to the center of the

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<sup>42</sup>Kulinder Pal Singh; Peering into the hearts of galaxies; CURRENT SCIENCE, VOL. 81, NO. 1, July 10, 2001

<sup>43</sup>Rocky Kolb; The Quantum & The Cosmos; <http://www-astro-theory.fnal.gov/Personal/rocky/welcome>

<sup>44</sup>C.Y. Hohenkerk, B.D. Yallop, C.A. Smith, A.T. Sinclair, "Celestial Reference Systems" in Seidelmann, P.K. (ed.) Explanatory Supplement to the Astronomical Almanac. Sausalito: University Science Books. p. 99



galaxy would correspond to the height of Mount Everest. When comparing the solar system to the rest of the galaxy, we can think of a mountaineer who has reached the summit of Everest and in whose pocket is a grain of sand<sup>45</sup>.

The Sun has a magnetic field- the heliosphere, which envelops our entire solar system. Most of the planets also have magnetic fields and radiate energy, which extend into space and form a “magnetosphere” rotating around with each planet (*Jupiter- 62 known moons, Saturn- more than 40, Uranus- 27, Neptune- 13*). If we reduce hypothetically the radius of the Earth to the radius of a typical wristwatch then the Sun would be equivalent to the height of an average man and distance between the Earth and the sun would then be four hundred meters. Pluto would be some fifteen kilometers away, but we would still have to travel about one hundred thousand kilometers before we reached the closest star to the Sun (*Proxima Centauri*), such a trip would be equivalent to travelling two and one-half times around the Earth<sup>46</sup>.

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<sup>45</sup>James E. Lidsey, “The Structure of the Universe”; *The Bigger Bang*; Cambridge University Press

<sup>46</sup>Ibid.

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