

The Alphabet of Knowledge – ABC
Philosophy and Theory of Science
General Principles & Items in Terms

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References & Bibliography

Theory of Cosmos, John A. Economides, Athens 2010, Greek
The Universe of Interactions, Athens 2012, English

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The Alphabet of Knowledge

Energy and Dynamics

The Scalar Properties of Energy

Variation, Dimension, Motion, Information, **Interaction**

Theory of Science - Interpretation and Definition

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Part II

Articles in Evolution

- A. **The Universe** is an **energy field**, therefore a **dynamic** and **dimensional**, spatial fabric and temporal framework of energy **variations** and **interactions**. Universal **energy dynamics** grow first into **quantum** states (decomposing) and then develop into the **physical** states (re-composing) of interactive **material** mass. Physical mass takes material forms of energy and specifically of **interactive** entities of matter and energy, from elementary particles to celestial objects. Originally the universe was a gravitational singularity.
- B. **Gravitational singularity** was the original **contractive** state of the Universe. In that state the Universe was an **infinitely small, hyper** hot, dense and **dynamic**, super vibrant **ball** of **energy**. This ball was a gravitational **singularity** at the **limit** of activity, density and pressure. Gravitational singularity was the **start** of dimensional **evolution** of energy states and conditions. In that singularity, **quantum** and **physical** states originally combined. These states decoupled with the Big Bang and recouple **interchangeably**, since at **variable combinations**.

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- C. **The Big Bang** was the beginning of the **dimensional universe**, when pressure broke the gravitational **limit** and reversed the dynamic of energy from **negative** of **contraction** to **positive expansion**. The Big Bang is the expansion event which decomposed the contractive **singularity** of power and **potentiality** of energy and recomposed it to the expansive **plurality** and multiplicity of interactive particles and the **reality** of force and mass. This **variable** plurality is **dimensional** and **universal**. The Big Bang was the main first energy and density variation. This first **change of state** marked the beginning of universal dimension and evolution. In **space** and **time**, this course of evolution marks the **interchanges** of **quantum decompositions** and **physical re-compositions** of **mass**. The Big Bang was the first **expansion** event, where relatively limited expansion allowed pre-formation of structures and forms. At the **limit** of the original composition of early mass, the Big Bang succeeded an ultra-violent, early mass decomposing, **hyper** expansion event, called inflation.
- a. **Inflation** is the **exponential** and accelerating **expansion** which followed the Big Bang energy **variation**. The **limitation** of the first stage expansion and specifically of the **composition** of early mass, then fired second stage instant hyper **explosion** of energy and exponential inflation which **decomposed** that **mass**. At the peak of acceleration, inflation yielded to deceleration and deflation.
 - b. **Deflation** is the relative **deceleration** at the peak (**limit**) of inflation. Deflation, **deceleration** and the relative **limitation** of **acceleration** of the universal expansion, was powered by the **re-combination** dynamics of energy in material **mass**. With deflation hyper-inflation yielded to limitation and settled to relative reflation.
 - c. **Reflation** is the **limited expansion** and **acceleration** of universal energy (mass). In sequence to inflation, which was **decomposing** of early mass, deflation and reflation **interchange** and **recompose** dimensional mass. These alternations and derivative variations, transform the relative limitation of **absolute** gravitational **singularity** and **uniformity** to the relative **plurality** and **multiplicity** of new particular limitations and derivative energy and density **variations**. Via inflation, deflation and reflation, the Big Bang, transformed the original **dynamic gravitational singularity** to the **dimensional universal energy field**.

The successive levels of evolution are as follows:

- I. Inorganic
 1. **The Universal Energy Field** is the **nexus** of energy and density **variations**, starting with **particles** and **relational interactions**. This nexus forms the **framework** and **fabric** of **dimensional mass** at the fundamental and **universal** level. The universal energy field developed from the gradual **diffusion** of temperature and pressure by the expansion and

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inflation and their relative recovery with **reflation**. In this **dynamic** field, **interactive elementary particles** developed since into **composite interactive entities** at broadly described universal formations (**elements** and **entities**), energy and density gradations of increasing interactive and reproductive complexity and composition. Powered by energy and dimension, **evolution** is the record of fundamental relations and organisations which develop **structures** and **systems, forms** and **functions, states** and **conditions**. Information and **knowledge** of evolution are and humiliating monuments of **universal intelligence**. This record is marked by the **scalar** properties of **energy** and more specifically by the **interchanges** of **quantum** (energy) and physical (matter) states which predominantly combine **unity** and **division** in **motion** and in the dynamic **evolution** of dimensional **mass**. At the second level of energy variation, material formation started with elementary particles and the fundamental interactions (forces) interrelating them.

2. **Elementary Particles** are **interactive polarizations** at **gravitational** level, powered by energy. Particles form at the **high peaks** of energy and density fluctuations (frequencies). Interactions form at the **low ends** of energy and density fluctuations (frequencies). In the dimensional Universe, contracted **gravitational singularity** expanded into multiple variable **concentrations** (matter particles like quarks) and **interactions** (energy interchanges with carriers like gluons) first at sub-nuclear level (of energy formation and information) first at the subatomic level (programming of energy and development of information). Interactions were **relational** and **organizational**. They also formed **conditions** and more specifically **dimension** and **motion** in **mass**. At the third level of energy variation, material formation continued with composite particles.
3. **Composite Particles** are **entities** composing of **coalescing** elementary particles relationally **interacting** by way of energy interchanges at **nuclear** level (of energy formation and information). At the fourth level of energy variation, material formation continued with atomic elements.
4. **Atomic Elements** are **composite particles** coalescing and **coupling** with orbital **electrons** (energy carriers) to interact and develop light atoms at **electromagnetic** level (of energy formation and information), first hydrogen and then helium. At the fifth level of energy variation, material formation continued with molecular compounds.
5. **Molecular Compounds** are energy **compositions of light atoms** coalescing and interacting with orbital **electrons** (interaction carriers) at **molecular** level. Electronic interactions develop **energy bonds** between atomic elements forming molecular compounds, which first composed of hydrogen. At the sixth level of energy variation, material formation continued with molecular clouds.
6. **Molecular Clouds** are **low density**, expansive energy – matter unities of coalescing interactive **compounds** at **molecular** cloud level. Molecular clouds grow massive and

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develop **gravity** which they compensate with **molecular structure**. Growth of mass reduces **stability** as against universal perturbations and at the **limit** of molecular structure, gravity rips the **hydrostatic balance** of molecular mass and molecular clouds **implode** (collapse) to create **higher densities**, usually stars. At the seventh level of energy variation, material formation continued with stars.

7. **Stars** are **high densities** developing from the **implosion** (collapse) of molecular clouds, which rip hydrostatic balance due to gravitational growth of molecular mass and to universal perturbations. High density increases **temperature** and **pressure** which fire **nuclear reactions** in the **molecular mass** of stars. These reactions **decompose** and **recompose** molecular mass to **chemical elements** and **compounds**. Stars re-organize energy in the next atomic level of electromagnetic transformation, which is the **chemical** level. Stars also **interact gravitationally** with **dimensional mass** and specifically with other stars and celestial objects developing **celestial motion**. They also form unities like constellations, galaxies and nebulas. At the **limit** of average **chemical** structure composition, usually iron, gravity and pressure rip the **hydrostatic balance** and stars collapse into **lower** and **higher densities** via double violent **gravitational implosions** and **explosions**. **Heavier** dynamic densities are **neutron stars** and even **hyper** densities like **black holes**. **Lighter** dynamic densities are **super nova** explosions. At the eighth level of energy variation, material formation continued with heavy atomic elements.
8. **Heavy Atomic Elements** are **composite atoms** made by the **decomposition** of hydrogen atoms and their **re-composition** into helium and then in heavier (complex) atomic elements via **thermonuclear fusion** in the high – density star cores. The heavy elements are first **non-metallic** and then **metallic**. At the ninth level of energy variation, material formation continued with heavy atomic elements.
9. **Super Nova Explosions** are powerful **explosions** of the star's **outer layers** when these **rip** from **inner layers**. This happens beyond the level of iron when the hydrogen and helium **fuel** of the thermonuclear **fusion** is exhausted and the release of energy is reduced raising **electromagnetic pressure** in the star's upper layers. Then the upper layers of stars explode **dispersing atomic mass** to space in hyper radiant **supernova** energy outbursts. At the tenth level of energy variation, material formation continued with neutron stars and black holes.
10. **Neutron Stars and Black Holes** are powerful **implosions** of the star's **inner layers** when these are ripped from outer layers. This happens beyond the level of iron when the hydrogen and helium **fuel** of the thermonuclear **fusion** is exhausted and the release of energy is reduced raising pressure in the star's upper layers. Concurrently the inner layers of stars left without energy structurally **collapse** and the melting (decomposing) mass implodes into **higher** and **hyper gravitational densities** forming neutron stars or even black holes. Neutron stars and black holes **gravitationally regulate** the **motion** of celestial bodies and no less importantly **configure** the **density** and so the **dimension** (in

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time and in space) of mass. At the eleventh level of energy variation, material formation continued with galaxies of star systems.

11. **Galaxies** are **celestial entities** of stars and constellations coalescing and developing **orbital motions** around massive **black holes**. Galaxies coalesce and form nebulae. At the twelfth level of energy variation, material formation continued with neutron stars and black holes.
12. **Chemical Compounds** are **compositions** of atoms including of **heavy** atomic material dispersed in space by **supernovas**, which coalesce gravitationally and interact with orbital electrons (interaction carriers). At the thirteenth level of energy variation, material formation continued with celestial bodies.
13. **Celestial Bodies** are **concentrations** of heavy atomic material, which dispersed in space by supernovas and then **gravitationally** coalesced, formed celestial bodies like asteroids, meteoroids, comets and planets and developed **motion**. At the fourteenth level of energy variation, material formation continued with planetary systems.
14. **Planetary Systems** are **celestial entities** of planets which interact **gravitationally** and develop orbital **motions** around **stars**. At the fifteenth level of energy variation, material formation continued with biochemical and organic compounds.

II. Organic

15. **Biochemical and Organic Compounds** are chemical compounds - especially of **non-metallic** elements, with increased interactive **decomposition and re-composition (metabolic)** propensities. These compounds generally follow **patterns** of **gravitational** and **electromagnetic** interactions on planets like Earth. At the sixteenth level of energy variation, material formation continued with biochemical and organic compounds.

III. Biological

16. **Biological Organisms** are organizations of biochemical and **organic** compounds regularly **decomposing** and **recomposing** into biochemical **metabolic** functions and systems. These organisms compose in **cellular** constructions (cells) and developing highly **interactive** and ultimately capable to regularly replicate and **reproduce** sexually and asexually this metabolic function thus creating **living** energy **organization** and **management** forms (**life**). At the seventeenth level of energy variation, material formation continued with plants.
17. **Plants** are cellular organisms, which use **phototrophic** metabolism (solar energy driven biochemical decompositions and re-compositions), interact and reproduce, grow and

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expand to form **ecosystems**. At the eighteenth level of energy variation, material formation continued with animals.

18. **Animals** are cellular organisms using **chemotrophic** metabolism, which further interact **electromagnetically**, develop autonomous **motion** and evolve into animals. In order to **control (two dimensional) motion**, animals develop **sensory - motor nervous** system. In animal organization, motion and interaction (essentially **metabolic** and **reproductive**) are controlled and directed by the central nervous system – the brain which manages **state, condition** and **information**. Animals coalesce, interact, organize and reproduce in schools, flocks, packs and herds. At the nineteenth level of energy variation, material formation continued with primates.
19. **Primates** are animals, which developed **brain neurology** via the **control of complicated** two (hands) plus two (feet) limb **motion** (kinetics) in the arboreal tropical environment. The control of the motion of hands and feet (**two dimensional**), **advanced** energy and information **management** and derivative interaction in primates, critically elevated animal intelligence to primate **intelligence**. At the twentieth level of energy variation, material formation continued with human beings.

IV. Human

20. **Human Beings** are primates, which elevated **brain neurology** via the **control** of independent two upper (hands / three dimensional) - two lower limb (feet/legs / two dimensional), **motion** (kinetics) first in the African savannas. This is the **bipedal** motion of the legs and the feet and of the arms and especially of the **free hands (three dimensional)**. Extension of the motion of the hands is the **use of instruments** (tools, weapons and other utensils), which further exemplified **human intelligence**. Primarily the nearly infinite **possibilities** (potentialities) in the motion of the free hands and conversely the evolution of neurological **sensory – motor** control of energy, variation, **information** and **time** in interactions via the **liberation** of the **hands** and the **use** and **manufacturing** of instruments (utensils and other materials) thus became significantly more expansive, pronounced and **powerful** in human beings than in any other creatures. At the twenty first level of energy variation, material formation continued with the human mind.
21. **Human Mind** is the **neurological function** of **sensory – motor control** of energy, variation, motion and information in **interactions** and **reproductions**. Due to the complex motion of hands (**use**) and instruments (**instrumentation**), the human mentality became more pronounced and powerful in human beings than in any other creatures. In human mentality, activity and behavioral expression, energy and time, interaction, organization, motion and so information are dominant. At the twenty second level of energy variation, material formation continued with human intelligence.

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22. **Human Intelligence** is the **neurological** and **mental** organization, which developed in the human neurological premises for the **management** of the scalar properties of energy and specifically of **limitation, variation, dimension, motion and information**. **Management** of energy, power and the control of force at the human level is even more information reliant than elsewhere in nature. Relational **interactions** and organizational **reproductions** happen in the **running present**. Time flows, in the current present of motion, where converge and fuse the **fixed reproductive past** and the **variable interactive (metabolic) future**. Information referring to energy management and the control of interaction derives from metabolic **analysis** and reproductive **synthesis** of the estimation of **probability** and the calculation and **computation** of **programming** motion. Information and conversely the human mind, dynamically combine the **uncertainty** and potentiality of **quantum emotion** (of the future) with the reality and **certainty** of **physical motion** (of the past). Conversely in human intelligence combine the (neurological) mental states (organizations and conditions) of (**reflexive emotional**) psychology and (**reflective motional**) logic. In human mentality interchanges and configurations of quantum states and overall **representations** of the bounded (limited) power of energy or the seemingly unbounded (unlimited) potentiality of force, frequently develop **supernatural** dimensions and **spiritual** or divine conceptions.

The **balance** of evolutionary dynamics in energy variations and **interactions** (and **reproductions**) remarkably secures **equality** of neurological (mental) **intelligence** underwritten by power and motion in biological complements at the level of species (example reproductive variations between **genders**) notwithstanding concurrent differentiations in rational, emotional or behavioral interactions, distinctly independent of particular genetics. The same dynamics similarly secure **equality** of **intelligence** in physiological variations at the level of **race** (example racial differentiations arisen from environmental attributes during latest glaciations), which are natural and normal in cultural or ethnic variations. At the twenty third level of energy variation, material formation continued with human psychology.

- **Human psychology** is the mental **reflexive** function (**sensory - motor**, interactive and neurological), of the control of **motion, interaction** and **information**.

Psychology is **emotional** or **impulsive** information function of low structure and definition. Therefore, psychology is approximate faster (**quantum**) **function** of the thinking process. Psychology configures thought into positive **feelings** attractive or receptive **emotions** like happiness, joy, love, pleasure and peace and negative, repulsive or aggressive like unhappiness, misery, pain, hate and anger.

At the twenty fourth level of energy variation, material formation continued with human logic.

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- **Human logic** is the mental **reflective** function (**motor – sensory**, reproductive and neurological), of the control of motion, interaction and information. Logic is rational or deliberate information function of high structure and definition. Therefore, logic is **accurate slower (physical)** function of the thinking process. Logic configures **thought** into rational conscience, cognition, volition, logic, memory, perception and imagination. This leads to reason, **representation** and symbolism from which develop signaling, meaning, interpretation, comprehension, **reason**, definition, calculation, **information**, **communication** and **language**, first oral then written. At the twenty third level of energy variation, material formation continued with human society.

23. **Society** is the human assembly (coalescence of interactive people) for the development **social relations, organizations and conditions** by way of information, communication, intelligence, intellectuality, technology, economy and ecology. Society is also for the **management** of time and resources, the development of the **control** of energy and of natural and artificial (technical) conditions. Social interaction and communication at the **individual** and **collective** level and derivative **legal** and **institutional** organization, provides for the service of the individual interest in **confluence** with the **common good** and beneficial interest.

In the technical and economic conditions of the human environment developed **communities** and civil organizations establishing **principles, practices and protocols** (traditions) for the social communication, collaboration, reproduction and **regulation** of human interactions (relations). In these connections, consents and contracts, societies developed **information** and **communication** sets like knowledge, languages, moral, legal and spiritual values, ethics, traditions, religions, cultures, rules, laws, constitutions and institutions.

Societies started to organize in communities first **agricultural** then **commercial** and **industrial**, in villages, cities, then in broadly urban **technological** and **economic** environments first on Earth and then in space stations and missions.

At the twenty fourth level of energy variation, material formation continued with economy.

V. Technical

24. **Economy**, developed from the scalar properties of energy. These properties rein (due to **limitation** and control) over the dynamic of processes at all levels of cosmological evolution. Economy is natural feature of deep origin, exemplified progressively and particularly at the biological and then at human level, **evolution**. The main energy transformations in life, which are interactive and reproductive **metabolism**, manifest the significance of economy as attribute of energy and of its scalar properties.

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Economy deals with the **management** and **control** of **energy, time, capital, assets** and **resources**. Technical, technological and ecological **means** (devices) are also economic and apply to structures and systems, forms and functions to develop **efficient** and **effective** conditions first by way of agriculture, livestock farming and by the management of plant and animal resources and then by manual, mechanical, industrial and electronic **applications** and **employments (utilizations and exploitations)**. Agricultural, industrial and electronic (digital) **production** led to the increasing control and **conditioning** (regulation) of human life and of the natural environment, in metabolic and reproductive terms and of its **metabolic transformation** from **natural** to **technical**, communal, civil and urban. The denomination of economic **values** into **money** and their **exchange** for such values accelerated investment, developed **production** and trade and created **wealth**, promoting consumption, transaction and the opening of **trades** and **markets** (exchanges). Therefore, economy together with technology and ecology are conditions of **society, humanity** and **civilization**.

Economies and techniques therefore **transform** energy to activity and **metabolise** raw materials to products of goods and services.

At the twenty fifth level of energy variation, material formation continued with technology.

25. **Technology** is the information, knowledge and technique of energy management and control for the **efficacy** and efficiency of structures and systems, forms and functions. Techniques manage organizational **information** programs and conditional processes. **Technical** operations and technological systems use energy to transform natural conditions to technical, therefore **artificial** and human conditions. Technologies and techniques use energy to transform raw materials to human and manufactured of goods and services.

Technology developed from the **use** of the **free hands** and by extension from **instrumentation**. This led to the control of fire (energy) and the **decomposition** and **re-composition** (transformation) of mineral materials first of stone and then of metal or other natural materials and resources and **information** digital devices used for instrumentation (tools and weapons, foods, fabrics, machines, electric devices and other manual, mechanical and electronic applications, appliances and utensils) and to the development of techniques for operation. In the civil domain **technological activity** configures into **technical collaborations**, workshops, factories and industries. Technology powerfully determined by way of material utility and instrumentation, provided the configurations of the main periods in the history of mankind:

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- **The Age of Stone**
- **The Age of Metal**
 - The Age of Bronze
 - The Age of Iron
 - The Age of Steel (the Industrial Period)
- **The Age of Electronic Information and Communication** (The Digital Age – contemporary).
- **The Space Age** (arriving)

Technology together with economy and ecology are conditions of society, humanity and civilization.

At the twenty sixth level of energy variation, material formation continued with ecology.

26. **Ecology** is the information and technique of **energy** in the natural and human **management** of resources and **control** for the **efficiency** of structures and systems, forms and functions. Ecology deals with the **natural** and **technical** relational and organizational processes. Ecological operations and systems manage energy to control the **transformation** of **natural** conditions to economic and **technical, human** conditions and specifically to human activity and raw materials to products of goods and services in **sustainable, renewable** and **environmentally friendly** processes.

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Ecology developed from the scalar properties of energy. These properties rein over the dynamic of processes at all levels of cosmological evolution. Economy is natural feature of fundamental origin, exemplified progressively and particularly at all levels of evolution.

Ecology together with derivative **economy** and **technology**, sustain and protect the **environment** and the **climatic atmosphere** from degradation and pollution. In the atmosphere uncontrolled emissions especially of CO₂ and methane from the excessive combustion of fossil fuels (coal, oil and gas) change the chemical composition of the atmosphere causing **global warming** and **climate change**, increasing volatility of **atmospheric temperature** and **pressure** therefore of **weather** conditions. The technological, economic and ecological management of energy, capital and resources and the development of derivative practices and technologies, control, conserve, protect, power and upgrade the environment, contain the ecological cost and with ecofriendly green and digital **management, utilization** and **exploitation** techniques. Ecology together with economy and technology are conditions of **society, humanity** and **civilization**. Ecology together with economy and technology develop moral virtues and spiritual values, which make us better people and the world and hopefully the universe, a better place.

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