THE SUN AND A NEW THEORY OF LIFE: THE HELIOS THEORY

The connection between the most recent results of solar research and the ecological civilisation.

Author: Attila Grandpierre

The Sun is the cosmic foundation of our life. In the past four decades, such facts have been revealed about the origins of solar activity that have led to recognizing the Sun as a cosmic living organism, i.e. the Helios theory, which was elaborated with the help of a scientific worldview in which the exact science of life and self-consciousness are grounded, and which harmonises matter, life and self-consciousness. Interestingly, this comprehensive worldview manifests unique series of surprising coincidences with ancient Chinese philosophy and can serve as a scientific base to build an ecological civilisation.

We could think that our life is determined by direct material relations: eating, breathing, orientation, travelling seemingly depend on our immediate environment. Surprisingly, what plays a crucial role in creating, maintaining and managing life is not our immediate, or even our broader, environment on Earth but a factor in the sky, from a distance of 150 million kilometres: the Sun. Processes that allowed life and mankind to come into existence in the universe had evolved on this distance planet.
Up to this day, the physical nature of the Sun has been regarded unquestionable without any targeted analysis. As a result, the accepted scientific belief is that the Sun is "a luminous ball of gas that produces energy by the nuclear fusion" (Ridpath 1997, p. 450). This common view, however, should be re-evaluated in the light of fresh evidence emerging from several sources.

Undoubtedly, solar physicists have extensive knowledge about the Sun. There is one thing, however, that they cannot explain, and this is solar activity. My research of four decades into the origins and ultimate causes of solar activity has led me to the conclusion that the Sun changes a billion times faster during solar activity that it is expected on the basis of the standard solar model. What process can accelerate the magnetic field of the Sun by a billion times of what is physically expected? Oddly enough, this change accelerated by a billion times, instead of slowly levelling off and dying away as the laws of physics prescribe, is continuously regenerating. The formation of the dynamo that is required to explain these changes is one of the greatest mysteries of solar physics. Not by chance. A dynamo is a very complex machine; remarkable knowledge and tremendous engineering feat are required to create one. It was invented by Ányos Jedlik in 1861, based on Faraday and Maxwell's electromagnetic theory. How can the Sun create such a dynamo? A closer examination of these questions has led to developing a new theory of solar activity, the Helios theory.

Several predictions of this theory have proven to be true, and – as it seems – it should be taken seriously. Beyond doubt, mass flows transporting magnetic fields in the Sun's interior are responsible for accelerating the solar activity by several billion times. These mass flows crease, smooth and disperse magnetic fields no less than several billion (!) times faster than the equations of the star structure would indicate. On Earth, only living organisms can do so, since biochemical reactions take place several billion times faster in living organisms than under laboratory conditions, in the test tube. This is the first sign that a physical approach is not sufficient to interpret solar activity.

During the decades of my research a whole range of new sciences has developed, which provide a completely new context for a better understanding of the Sun. As it turned out in the last century, theoretical biology, developed by Ervin Bauer, is the only type of biology that can advance in the development avenue of modern science, and, while retaining and further developing the greatest reflections of physics, it has created its theory based on the universal life principle. Not only have I further developed the toolkit of physics, but I have also got as far as developing quantum physics. In quantum physics the detector plays a central role, and therefore it depends on the general theory of detectors, as one of the fellow scientists of Werner Heisenberg, the father of quantum physics also recognised and discussed with the author of this article. Theoretical biology, achieved by developing quantum physics further, can be regarded the biggest leap after quantum physics. I realised that the fundamental principle of the biology that Ervin Bauer developed is extending the fundamental principle of physics over the realm of life, and it penetrates the Universe more profoundly than that of physics. Therefore, the Universe can be regarded to be more of a biological nature than a physical one. And if the world is principally of a biological nature, the Sun also can be principally of a biological nature. Our aim is to revise the image created about the Sun couple of hundreds of years ago.

Especially, because information theory has evolved in the meantime. If we consider it when examining the Sun, it might occur that, in addition to its light and heat, sunshine can play a substantial role in the evolution of life on our planet because of its information content. Anthropic cosmology, in fact, biofriendly cosmology, has evolved, which is based on the facts that constants in physical equations, such as speed of light, the mass of an atom, strength of physical interactions, etc. all fall within a narrow range of possible values that is favourable for the development of life. Today, it is widely accepted that we live in a biofriendly Universe, favouring life. If the entire Universe is biofriendly, the Sun is likely to be biofriendly, too; it is high time to examine the Sun from this new viewpoint. The independent science of astrobiology has also evolved, which has become one of the fastest growing branches of modern science. Astrobiology is a science studying the relationship between the universe and life, and is based on a statement made by Nobel Prize-winning Christian de Duve: life is a cosmic imperative, coded in the laws of nature, thus it is bound to arise wherever proper conditions prevail, and even where they do not, processes are bound to reach that end. If processes all over the Universe are bound for life, then the only question is to what extent these processes bound for life prevail on the Sun.

„For the Earth, the Sun is the greatest natural resource."

The significance of all these are further enhanced by the emergence of the Gaia theory, which, again, evolved independently. James Lovelock discovered that the Earth is a self-regulating system, controlling the changes in the atmosphere, the crust and the biosphere to keep environmental conditions near the range that is most favourable for life. If one planet of the solar system is a self-regulating, life-like system, it is even more timely to examine the processes taking place on the Sun from this respect.
Nevertheless, the current situation of mankind, the ecological crisis make it imperative to re-evaluate our entire worldview and to appreciate Nature. For the Earth, the Sun is the greatest natural resource. At the current rate of energy consumption, mankind consumes as much energy in one million years as much the Sun generates within one second. According to some predictions within fifteen years, while according to other predictions, within thirty years, solar energy will become the greatest, and, in addition, environmental-friendly, renewable and inexhaustible source of energy. Planting solar panels in one small corner of Spain would provide energy supply for entire Europe. The Sun will play a central role in our everyday life, and this fact considerably appreciates the Sun.

ORIGINS OF SOLAR ACTIVITY

Today's astronomy can describe only the static, relatively permanent side of our Sun. But our Sun has another, much more exciting and scientifically still unexplained side: this is solar activity (Figure 1).

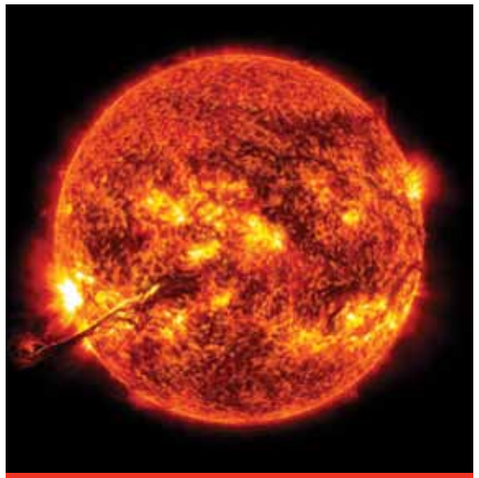

Figure 1 Solar activity generates active, moving hot spots and dark sunspots on the surface of the Sun. Sunspots are brought to the surface by mass flows taking place in the Sun's interior. In sunspots, the magnetic field is much stronger than in their surroundings, therefore mass is thinner in them and they look darker. Great solar flares tend to appear on top of the loop-shaped bundles of magnetic flux connecting two sunspots and protruding upwards. But what generates these mass flows?

According to a currently popular theory of solar activity, sunflares emerge in the outer atmosphere of the Sun, as phenomena of electrostatic discharge similar to the lightnings of the Earth's atmosphere. As a contrast, I have pointed out that solar activity is comparable to a volcanic activity. It must start from deep in the Sun, because there is neither enough substance nor energy in the atmosphere for solar activity, and these 'sun-lightnings' of the Sun's atmosphere would not be able to change magnetic fields cyclically under the surface of the Sun. Solar activity is bound to start from within, from the depth of the Sun. I have proven that the Sun's rotational energy is released, just like in earthquakes, in a point-like region in the Sun's interior from time to time, when growing tension bursts out due to the interplanetary space braking the rotation of the Sun. Similar to volcanic magma, the rotational energy releasing suddenly heats the point-like area of the solar core to a very high temperature. I have noticed a very important factor.

When this hot area evolves in the energy-generating core of the Sun, core reactions also contribute to heating. Core reactions accelerate at a higher temperature, and their energy generation multiplies. When deep in the Sun, an area gets hotter, core reactions generate energy faster due to the higher temperature. If energy is generated faster, it will become even hotter, which further accelerates energy generation – and so on. A self-accelerating, explosively heating area evolves. This area explosively broadens as long as buoyancy, exerted by dilatation, flies the entire hot bubble from the solar core towards the surface of the Sun. On its way to the Sun's surface, the hot bubble, gaining speed because of buoyancy, reaches colder areas. The accelerating speed of the hot bubble is calculated to reach the speed of sound decreasing towards the surface near the Sun's surface, and a sonic boom occurs. In the sonic boom, the energy of the hot bubble is transferred to a high-energy particle beam shooting upwards. This high-energy particle beam, going outwards in the atmosphere of the Sun, collides into the top of the bundle of the magnetic flux transported to the surface by the hot bubble, and the sudden slow-down of the high-energy particles results in sunflares causing bright flashes of light. Instead of solar lightnings, we can talk about solar volcanos.

My theory, developed in full detail with the help of the numeric calculations of Gábor Ágoston, has raised the attention of Robert Ehrlich, Professor at the George Mason University. Our calculations have indicated that the hot bubbles generating in the solar core produce such heat waves that persist for millions of years. Since they are generated in every 11 years, these heat waves slowly add up while spreading in the Sun's interior, and reinforcing each other's effect, they are able to heat up the entire solar core. Ehrlich calculations suggest that these heat waves make the temperature of the solar core fluctuate and change cycles lasting either 100,000 or 41,000 years. This result has hit the headlines of the New Scientist and become something of a scientific world sensation because exactly these cycles lasting either 100,000 or 41,000 years are the two major periods of Ice Age on the Earth. Thus, the Ice Ages on the Earth are closely related to the pulsation of the solar core.

THE SUN ITSELF CREATES THE DYNAMO, THE ENGINE OF SOLAR ACTIVITY

The big question is how these mass flows are able to generate magnetic fields. A dynamo is required to convert the kinetic energy of the mass into magnetic energy. The dynamo is the reverse of the electric engine, because the engine converts electricity into kinetic energy. (Figure 2)

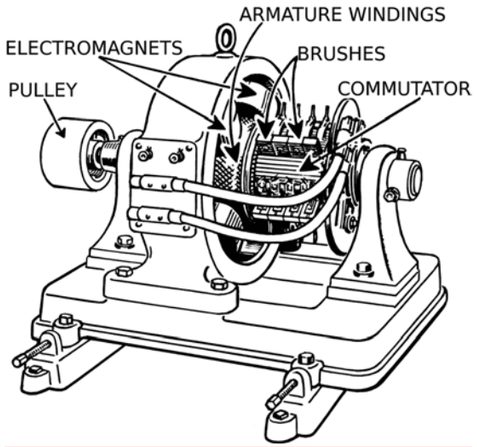

Figure 2 The dynamo is a sophisticated machine, in which the relative movement between magnetised parts generates electromagnetic fields. According to solar physicists, the dynamo is one of the genuine "mysteries" of astrophysics. (Carpenter et al., 2005).

Since neither an engine nor a dynamo is easy to design, such dynamo cannot come into being by physical means. On the Earth, dynamos are created by people or living cells, since molecular machines are produced in cells. But only living organisms can create a dynamo on the Earth, then how is it possible for the Sun to create, then get rid of, then re-create its own dynamo in every eleven years, without solid parts, of malleable mass?
This thread, connected to the dynamo, of examining the origins of solar activity also led to the question whether the Sun is possibly life-like. In order to decide it validly, we need exact biology. As I am a Hungarian researcher, fortunately Ervin Bauer's theoretical biology, published only in Hungarian and Russian up to this day, is available to me. The Bauer principle provides that the distinctive feature of the work performed by a living system is that it is aimed at renewing their ability to perform work. It requires special efficiency, organisation, and an extreme acceleration of processes recharging a discrepancy in energy. The fundamental principle of living organisms is represented by an inevitable occurrence of processes diverging from the thermodynamic equilibrium. The discoveries of astrobiology provided conclusive empirical evidence for the universal fundamental principle of biology (Bauer 1967, Grandpierre 2007). Life as a cosmic phenomenon is significantly independent from matter, it is not bound to carbon, proteins or DNA, because its essence does not lie in its material carriers but the behaviour of the living organisms. The activity to sustain life is necessarily and inevitably in place in the behaviour of all living organisms. This universal law of life is provided by the universal fundamental principle of biology, which provides that all living organisms use all their energy in every moment to avoid the equilibrium which should be established under the given initial conditions by the laws of physics (Bauer 1967, 51; Grandpierre, Chopra and Kafatos 2014). If the entire Universe is pervaded by the fundamental principle of biology, then the Sun should also be pervaded by it. The fundamental life principle is the law of the change of charges. These biological processes, which are against physical changes, are instinctively self-initiated by living organisms.

How can living organisms initiate their own behaviour? Our mindset, being used to the exclusiveness of physical causes, finds it hard to understand it clearly. The difference between an action and an event lies in the fact that a physical event takes place as a result of merely physical causes, external circumstances and inertia. On the contrary, what makes an action is the fact that it is different from an event because it is the living organism itself that creates a cause and these biological causes direct the course of action. Recently, a collaborator and I have developed the theory of biological autonomy in full detail (Grandpierre 2012, Grandpierre and Kafatos 2012, 2013). Biological autonomy is based

on our ability that we, as living organisms, are able to have biologically controlled energy. Decisiveness is the bridge between biological and physical causes. Our biological aims become physical realities by means of our decisions. Physical causes can enter the world of physics within the limits marked by the uncertainty principle of quantum physics. These limits are seemingly tiny, since they are applicable to the life of elementary particles. The uncertainty of quantum physics allows biological causes interfere with the physical world, within the framework provided by the uncertainty principle. But, since each elementary particle has a tiny bit of uncertainty, and the number of elementary particles in living organisms can be measured with astronomical numbers, it all adds up and even these tiny bits of quantum effects result in significant differences between the behaviour of physical objects and living organisms.

AN OVERVIEW ON SOLAR ACTIVITY

The Helios theory has proven that the Sun initiates quantum-level interventions from its own structural level, in a way so that they should lead to a result in line with the principle. The essence of solar activity is that the sun is continuously mobilizing its energies in an extraordinarily special way so that the conditions of the energy mobilizing activity should be continuously recreated. The changes in the energy of the Sun, that is the work of the Sun, allow the most work possible. Therefore, the Sun initiates quantum-level interventions in the solar core to create such a dynamo that generates the magnetic fields required for solar activity, aligns and consistently organizes mass flows and the changes in magnetic fields. We have found a remarkable range of evidence, implicating that the Sun initiates and organizes its own activity. Our theory is also supported by a numeric simulation and its fully elaborated version was named the Helios theory (Grandpierre 1990, 1996a,b, 1998, 2004, 2015a,b). Our prediction about the discovery of the dynamic processes of the solar core has already been justified. The new theory of the solar core predicts that the Sun can enhance the tiny effects of planets to an extreme extent if adequate internal conditions prevail. The effects of planets act as a kind of key stimuli, triggering sunquakes, sudden, point-like releases of rotational energy in the solar core (Grandpierre 1990, 1996a,b). In the hypocentre of sunquakes, hot bubbles are formed, which can elevate onto the surface, and there they trigger surface solar activity. Our prediction that thermonuclear runaways occur in the solar core has been confirmed by others as well (Hiremath 2010, Haubold and Kumar 2011, Scafetta 2012, Yndestad and Solheim 2016). Similarly, our prediction that hot bubbles are formed in the solar core has been supported by others (Wolff and Donovan 2007, Wolff 2009).

The four decades of my research show that solar activity is initiated by the Sun itself for biological aims, to sustain its own activity. My research has led to an unexpected result: it created a new image of the Sun, in which the Sun is a living organism, that is, it is similar to the ancient view of the Sun being a sun god, Helios. After having read the English manuscript of my book on the Helios theory, James Lovelock, a prominent figure of British science, who has grounded the theory of the Earth being alive with his book Gaia, endorsed the book with the following words: “A shining book illuminated by the effulgence of our own star, the Sun. For the serious scientist a primer on Solar System Science.”

AN EXPERIMENT ADEQUATE TO CHECK THE HELIOS THEORY EMPIRICALLY: THE SOLARIUM EXPERIMENT

All light carries information. If the Sun is a living organism, it can carry information also about the living nature of the Sun. In this case, sunlight, due to its information content, might mean extra information for life on Earth. During its existence of four billion years, life on Earth must have learnt how to use the information content of sunlight, if there is any. We have designed an experiment to test one of the predictions related to the biological nature of the Sun of the Helios theory empirically.

In a greenhouse, a tomato plant is given whatever matters in a physical sense: an abundance of nutrients and energy, creating virtually optimal environmental conditions. In comparison, the life of “wild” tomatoes grown outdoors might seem sheer deprivation, hardship and struggle. Still, tomatoes grown outdoors are tastier, have better biological effects compared to the “civilised” artificial ones grown in greenhouses. Something is missing, because if only substance and energy mattered, greenhouse tomatoes should outdo “wild” tomatoes from all respects. However, a lot of observations contradict this. Something is missing, and this something might be, among others, informationbiological information that can play a role in the formation of life, the development of a tomato. And this can be proven or denied with experiments. If the Sun is alive, the vitamin, flavonoid and flavour content of tomatoes grown in a solarium is even less than that of tomatoes grown in greenhouses. This experiment is not very expensive, and is relatively easy to conduct. Its significance, however, might be greater than that of extremely expensive experiments of particle physics.

THE SUN IS A COSMIC LIFE FORM

Consider that in the light of the revolutionary discoveries of astrobiology, life is the basic phenomenon of the Universe. Physical conditions are extremely diverse in the Universe. The ability of life to adapt to

extreme circumstances is much greater than it has ever been presumed. Under these extremely diverse circumstances life can take extremely diverse forms. The Earth is just one example of life; we do not know what other forms it can take, even not protein-based ones. There are more than forty billion planets in the Milky Way galaxy. Life can also exist on the moons of planets and cosmic clouds, not just on planets. According to James Lovelock's Gaia Theory the Earth behaves like known life forms: it regulates physical conditions essential for life to remain in the range most favourable for its life. If the Earth is a kind of cosmic life form, the Sun, which ensures this self-activity in the most favourable way for solar activity, cannot be denied of this.
If we define living organisms as the currently known living organisms of the Earth, the Sun is not one, because the living organisms of the Earth pursue a metabolic, reproductive way of life, maintain vital relationships with their environment, and consequently an extremely rich and complex information flow takes place between them and their environment, and they have the necessary apparatus to absorb and react to information.
Unlike terrestrial living organisms, the Sun relies on its own energy source. Thus, it does not need a metabolism with its environment. The lifespan of the Sun is ten to fifteen billion years, comparable with the age of the Big Bang, thus the "reproduction" of the Sun requires qualitatively different means. If sunlight carries biological information, it might play a key role in the formation of life on the Earth, and we van presume that terrestrial life is the child of the Sun.

The Sun has an extremely rich internal life. Its information processing mechanisms are yet unknown. One thing is sure: the Sun's mass consists of high-temperature plasma permeated by electromagnetic fields; partially or entirely ionized matter. Such plasma is the most complex matter of the Universe. David Bohm had the impression that plasma had a life-like behaviour, due to their surprisingly high-level of organisation, an abundance of their cooperative phenomena and their extremely sensitive ability to react to internal and environmental changes. The temperature and the pressure in the interior of the Sun generate very favourable conditions for electric currents of a threadlike structure to form very easily, almost spontaneously, as electronic stimuli form in the neurons of the human brain. If the biological nature of the sun is proven, in principle the Sun can process much more information per second than the information processed by terrestrial living organisms. Tribus and McIrvine have published an article in the "Scientific American", claiming the entire energy content of sunlight is likely to contain so much organized information that its volume possibly exceeds the information processing capacity of mankind and even all terrestrial forms of life. If the term "living organism" evokes familiar, terrestrial forms of life, it is more fortunate to regard the Sun a kind of cosmic form of life and not a living organism.

THE RELATIONSHIP BETWEEN THE HELIOS THEORY, AN INTEGRAL WORLDVIEW, ANCIENT CHINESE PHILOSOPHY AND THE ECOLOGICAL CIVILISATION

The research into the origins of solar activity and the simultaneous developments of interdisciplinary sciences attach considerable weight to the conclusion that the Sun must be a cosmic life form. This outcome fundamentally concerns our entire worldview. The main aims of mankind include the development of a healthy civilisation being in harmony with life, common sense and Nature (Grandpierre 2002, 2012b, 2017b). Above all, building a healthy civilisation requires a healthy, balanced, that is fundamentally comprehensive worldview. Worldview determines what the important questions are, and how answers to them should be sought, and what is considered an acceptable answer. Worldview determines the fundamental direction of building the future. A healthy, integral and comprehensive worldview requires exact holistic science, grasping the essence of the Universe in its entirety. We propose that holistic science, embracing all really important realities can be achieved if it is based on the holistic theory of matter, life and self-consciousness (Grandpierre 2012b, 2017b).

Modern science built on the exclusiveness of physics is not complete. Building on Ervin Bauer's landmark work, it has been proven that biology has laws that are not deducible from physics. The fundamental principle of physics can be deducted from the fundamental principle of biology, and laws of physics can be deducted from the fundamental principle of physics. Consequently, physics is not the only fundamental natural science. While construing the fundamental principle of biology, it has turned out to be inseparable from biological autonomy. Holistic science has found the fundamental principle of matter, life and self-consciousness, and demonstrated that they can be conceived as various cases of the same cosmic principle, with the life principle being the most general and fundamental of all.

The comprehensive scientific approach that we had to develop for the Helios theory had to include biology. As a result, it means a scientific worldview that is broader, balanced and more profound than that of modernity. We have got to a complete, healthy worldview, which is based on exact primary principles also described mathematically. This healthy worldview can provide scientific grounds for developing a healthy civilisation in the same way as the hegemony of physics provided the grounds for modernity.

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Developing a coherent, holistic, comprehensive science is a basic aim of constructive postmodernism, associated with Whitehead. As Whitehead has put it: philosophical knowledge is an endeavour to frame a coherent, logical, necessary system of general ideas in terms of which every element of our experience can be interpreted (Whitehead 1978, PR, 3). In the opinion of Cobb and other constructive postmodernists, such comprehensive world model is possible and necessary (Cobb 2002, Griffin 2007, 5-7). The Helios theory and the comprehensive scientific worldview place physics, biology and psychology onto the same grounds and align them, based on the first principles. They provide biology and psychology with a fundamental principle of their own, attributing a theoretical basis and significance similar to modern physics. The Helios theory and a holistic natural science reconcile natural sciences, humanities and social sciences. A clear definition of the life principle provides a scientific basis for developing ethics, in which respecting, supporting and enhancing life are regarded as major basic ethical principles (Schweitzer 1923, 94; Macer 1998, 146-147).

Whitehead's philosophical work was based on his conviction that religion and reason must be, and can be, reconciled. In these days, it means reconciling religion and science. A holistic and comprehensive science can remedy the estrangement of Nature and society, ensued by modernism. The holistic worldview remedies the secession between science and religion, because the three fundamental principles of the Universe form a coherent, harmonious whole, the unity and harmony of body and mind, matter, life and consciousness.
This essentially complete worldview can remedy the detachment and disharmony of sense, sensation and intuition. Comprehensive science says matter is governed by the fundamental principle of physics; sensation and intuition are governed by the fundamental principle of life, and logical thinking is basically governed by the fundamental principle of self-consciousness. Matter, life and self-consciousness are in basic harmony, because the living Universe is an integrated whole of matter, life and self-consciousness.

These basic, all-encompassing cosmic principles can be regarded the most profound essence of the Universe, the innermost core of Nature (Grandpierre 2011a,b). Remarkably, the most fundamental of these three fundamental principles, which encompasses and integrates the other two, is the life principle. The most fundamental nature of the Universe is its being alive (Grandpierre 2002, 2012b, 2017a). It is Life is that embraces the Universe; matter and consciousness are also the manifestations of Life. One day all of us will realize that life is not a tiny sparkle somewhere in the depths of our body, but the eternal cosmic flame itself, the primal reality embracing the entire Universe.
Surprisingly, our integral worldview demonstrates a range of similarities with the works of Alfred North Whitehead, John Cobb, David Ray Griffin, Thomé H. Fang and Zhihe Wang, constructive postmodernism, and especially the philosophy of the high culture of the ancient Silk Road, the ancient Hungarian tradition, and, it must be emphasized here, ancient Chinese philosophy. We think the most fundamental difference between the modern Western mindset

and the ancient Chinese one is ontological: according to modernity, exclusively matter is the fundamental being, while the Chinese mindset is that life is the most fundamental, the source of all other realities. The cosmic life principle can be conceived as an exact, scientific definition of 'Qi'. Since life itself is the creative force, an uplifting force creating new life, an internal force that is aimed at creating the most beautiful and sublime life possible, the cosmic life principle can be identified with creativity. In this regard, the life principle of the holistic natural science is identical with Whitehead's process philosophy (Whitehead 1978, 31), as well as with ancient Chinese philosophy.

The following statement can be found in the Book of Change: "The fulfilment of Nature which is Life in perpetual creativity is the gate of Wisdom bodying forth the value of Tao and the principle of righteousness", writes Thomé H. Fang, a prominent figure of twentieth-century Chinese philosophy.
We can call such ethical features of activities righteous that help, improve and fulfil life. The life principle naturally entails the love of life, and even an emotional commitment to life manifesting in actions. Life is qualitatively more than modernity can see it, because its essence is granting victory to complete integrity and beauty of life. Since the life principle impels all living organisms to live the most complete, most beautiful, happiest and truest life (Grandpierre 2012, 2017a), life is the basis and cosmic source of goodness. Life is good because it aims at preserving, embellishing and transmitting life.

Remarkably, the integral worldview discovered during the development of the Helios theory demonstrates a range of similarities with ancient Chinese philosophy. These similarities include the next six, essential elements: knowledge of the life principle, being the most fundamental principle of the Universe, change, creativity, goodness, and comprehensive harmony. The fact that six such unique features match is hardly a coincidence. Since Western modernity lacks them, it is worth overviewing the connections between these features.

The starting point of holistic science is the life principle, because all existence starts from it; the cosmic life principle is the most fundamental principle of the Universe. Similarly, in Chinese philosophy, 'Qi' or 'c'hi' is the cosmic life principle, the ultimate basis of all beings of the Universe, the source of the existence of the Universe (Zhenyu Zeng 2011). German Sinologist De Groot calls the ancient Chinese system of metaphysics, the basis of the entire Chinese philosophy "universism" (De Groot 1912; Glasenapp 1975, p141). All Chinese traditions "converge on one essential point: The Universe, as it is, represents an all-comprehensive Urge of Life, an all-pervading Vital Impetus, not for a single moment ceasing to create and procreate and not in a single place ceasing to overflow and interpenetrate" (Fang 1987, 688).

"The Helios theory and a holistic natural science reconcile natural sciences, humanities and social sciences."

Holistic science, just like ancient Chinese philosophy, thinks that the life principle itself is the creative force, the ultimate source of changes creating new things. The same cosmic life principle is the fundamental principle of goodness. Since humans most fundamentally are living organisms, the universal fundamental principle of goodness is the universal fundamental principle of human behaviour. The same cosmic life principle unites matter, life and self-consciousness in the entire Universe, and provides all-embracing harmony. As the Helios theory has demonstrated, this cosmic life principle is the source and engine of solar activity. Developing a healthy, ecological civilisation is unconceivable without a school system built upon a healthy, ecological worldview.

THE CORRELATION BETWEEN SOLAR ACTIVITY AND THE CREATIVE FORCE OF MANKIND

For a long time, it seemed impossible to prove by strictly scientific means the close relationship between the human mind and solar activity. Recently, however, a scientific breakthrough has come in this field. Suitbert Ertel, a psychology professor at University of Göttingen, conducted an analysis of a huge database by means of mathematical statistics. Ertel's work was inspired by one of the most significant anthropologists of his time, Alfred Kroeber, who, in his book Configurations of Culture Growth, published in 1944, wrote, "it is the frequent habit of societies to develop their cultures to their highest levels spasmodically". In terms of Western civilisation, Kroeber's most known "peaks in cultural creativity" include the Golden Ages of the Renaissance, the Baroque, the Rococo, and the Romanticism. Kroeber studied the time of outstanding works of painting, poetry, sculpture and science. Ertel's studies were aimed at analysing the data of painting, poetry and science.

Suitbert Ertel examined the works of 40,700 painters from Western civilisation. The data on the painters, compiled by Isabella Errera, a Belgian art historian, were obtained from 1,550 sources, taking the data of exhibitions, museums, the sales of paintings, catalogues, and other sources. Ertel found two waves of creativity in painting, one of the peaks emerged in 1645. He also examined poetry. Based on the extensive collection of data by H. A. Frenzel and E. Frenzel, as well as in Bertelsmann's Lexicodisc, a creativity peak occurred in poetry 10 years later, in 1655. After that, he compiled the Master Index of scientific discoveries, using 26 manuals, lexicons, encyclopaedias, biographies and textbooks om the history of science from 1440 to 1800. He found that scientific creativity culminated in 1670. All the three peaks, in 1645, 1655, and 1670, were significant, over the margins of tolerance, and all showed a sudden, at least double intensification of creativity. This was the age of rebirth, the Renaissance.

After that, he compared these data with the second largest similar collection of data, the Chinese one, for the same period. The outcome was surprising. The Chinese data showed that the peaks of creativity in painting, poetry and science occurred exactly at the same time as in Europe: in painting, it was in 1645, in poetry it was in 1655 and in science it was in 1670. Ertel asked the question, "Is it possible for the creativity of civilisation to show several peaks of at least double intensity, all in a relatively short period of time, in all areas of culture? Furthermore, is it possible to happen simultaneously with the number of artists of an unknown civilisation, which is situated more than fifteen thousand kilometres away?"

Such a peculiar and multiple coincidence between European and Chinese data must have a common cause, and from a geophysical source, Ertel argues. Remarkably, he found a factor with which these peaks coincide – in solar activity. It is widely known that solar activity is cyclical, but it is not the same period that repeats. Solar activity has a period of 11.2 years on average. There are some solar cycles, however, that last for 14 years, and there are some that last for only 9 years. There are major irregularities in solar activity. One of the most significant irregularities is a sudden drop in the number of sunspots, which began in 1625. Solar activity almost completely stopped between 1645 and 1715. Astronomers regard this phenomenon an anomaly in the activity of the usually "well-behaving" Sun. This irregular low-activity period is called Maunder minimum, named after Edward Walter Maunder, who discovered this phenomenon in 1898. The study of the origins and the nature of solar activity led us to the conclusion that the Sun is alive. Life is inseparable from the decision-making of living organisms. Decision-making, the self is the centre of conscience. Thus, the living nature of the Sun also entails the conscious nature of the Sun. If solar activity is a vital activity, then it is also a conscious activity. Human creativity also manifests in conscious activities. The facts that show the coincidence of the extraordinary period of human creativity in the Renaissance and the extraordinary period of the Sun are firmly grounded, have great statistical significance, and are extremely reliable due to the high volumes of processed data.

These facts are rooted in psychology as well as in solar activity. These two fields are seemingly very distant, and their correlation and coincidence require explanation. What seems odd today might become clear tomorrow, with a better understanding of the relationships between the Sun and the Earth. Hopefully, the gaps in our knowledge about the nature of the effects exerted by the Sun will be filled, and we can discover their nature, and neurophysiological correlations. Ertel's novel result, the accuracy and the methodological quality of the work he did was recognised by Hans Eysenck, one of the most prominent psychologists of the time.

If this entails another explosion of human creativity, the long-awaited New Renaissance can come.