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TITLE: TIME, ELEMENTS AND EMOTIONS: Temporological Aspects of Prenatal Psychology

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*I suggest that this is the essence of freedom,
to realize one's true potential, whatever the source
of potential may be.
David Bohm*

Abstract

Time is important for specialists from many different backgrounds. In this paper I wish to summarize my work on temporology and to focus on selected topics which are of special interest to Prenatal Psychology, i.e. the Effect of Celestial Twins (ECT), the Phoenix Clock model and a four-element emotional theory. Although at first glance they might seem as loosely related topics, these themes are forming a cohesive unity. Once we gain better understanding of the different times and the related Birth Potentials and Elements, there may be better chances to improve our parenting and harmonious child-raising. These temporal theories will also be illustrated by a unique case of one of the giants of 20th century music, Sergei Prokofiev, born during the Phoenix Hour of 1885-1900.

Keywords

time, Prenatal Psychology, temporology, chronology, the Phoenix Clock model, Phoenix Hour, elements, emotions, *Stoicheion*, Sergei Prokofiev, biographies, child-raising

Introduction: Temporology as a Way to Realize Our True Potential

The main aim of this paper is to show how temporology – a study of time – helps us to evaluate our inborn potential and to grasp its connections with the Prenatal Psychology. To start, let us notice that our moment of Birth (we shall mark it as the Birth Point, BP) divides our personal history into the past, present and future. In other words, BP becomes a milestone or a turning point between the epoch which precedes our birth (past) and the following periods of our active participation in the mundane life (present) and our possible posthumous influence on the next generations (future). We shall briefly discuss the meaning of time, its definitions and measurements of duration in the first section of this paper.

For over 25 years, I have been conducting experimental studies of the relationships between our Birth Potential and the Birth Point (BP). From the historical point of view, such connections seem to be self-evident. Of course, our inborn potential depends on the *Zeitgeist* of our historical epoch as well as on the specific transgenerational history of our family, and both are

evolving in time. Nevertheless, it is not obvious that these changes should be governed by certain temporal laws.

To reveal the laws of time it was first required to establish the very fact of the meaningful connections between Birth Points and Birth Potentials. Indeed, such connections were explored by me in two series of biographical studies. In *Celestial Twins* it was shown that people who share the same or very close Birth Points share also similar Birth Potentials, and thus they have an isomorphic matching between their life narratives [1]. Later this phenomenon was named the Effect of Celestial Twins (ECT), and the temporal factor of birth responsible for such an isomorphism was called the Theta-Factor. We shall discuss this effect in the second part of this paper.

In a sharp contrast, people who have different Birth Points usually have different Birth Potentials. Such a difference becomes especially vivid when we analyze large-scale historical processes, as is described in my book *The Phoenix Clock* [2]. In addition to the sharp differences between Birth Potentials, the proposed Phoenix Clock model reveals long-term cycles characterized by the recurrent patterns of historical phases. I shall present this model in the third section of this paper.

A very special role in our Birth Potentials is played by our emotions, and the Whole-Self approach stresses the importance of the quality of a baby's welcoming in the world [3]. In the fourth section I shall discuss the temporological connections between Birth Points and our emotional nature as described in my recent research presented in *Cartography of Emotions* [4, 5].

To conclude, it will be shown how understanding of the Theta Factor and Birth Points can be useful from a practical point of view. It will be illustrated by a specific case study of the famous composer Sergei Prokofiev whose life path presents invaluable information about the laws of time and the importance of prenatal history [6, 7].

Before we proceed, it would be stimulating to look carefully at each word in the long title of the paper: "Time, Elements and Emotions: Temporological Aspects of Prenatal Psychology."

Time is not defined in the natural sciences, and it has a wide spectrum of radically different meanings, to mention just a few of them: **timing, age, duration, season, moment, instant, era** or even **fate**. Although time in physics remains a fundamental concept, it is widely accepted that we have learned how to measure it. Yet can we measure something without defining it? A funny anecdote: last year I was invited to speak at the International metrological symposium in Bulgaria. One of the organizers introduced me in Bulgarian to a group of young scientists. They were excited and told me that they would be glad to learn more about **meteorology**. I had no idea what they were talking about: for me measuring durations is not the same as measuring temperature or humidity. As it was explained to me later, this misunderstanding occurred due to the nature of the Bulgarian language, in which "time" and "weather" are denoted by the same word "vremeto." The same situation can be found in at least five other languages: Croatian, Corsican, Catalan, Portuguese and Serbian.

Furthermore, the root "tempo" is common for such seemingly different things as **musical pace, temperature** and **temperament**. As soon as we mention "temperament," there is an immediate association with the four-temperament theory and the four basic elements. Since the days of Plato, the Greek word *Stoicheion* (in Latin, Elements) was used in a metaphorical sense to describe the four basic principles of the Creation – Water, Air, Fire and Earth [e.g. 8]. The situation changed in the 19th century, and since Antoine-Laurent de Lavoisier – one of the founders of the modern chemistry – the natural sciences use this word in a sense of the major building blocks of the material world, like in Mendeleev's periodical table of elements. As a result, physics and chemistry has focused only on the Earth element, ignoring all the others, such as Fire (Desires or Motivation), Air (Logos or Abstract Ideas) and Water (Feelings or Emotions).

In olden days, elements were also tightly connected with feelings, and many philosophers were looking for recipes how to temper them. Such modern thinkers as C. G. Jung or Gustav Bachelard continued to treat Elements in their metaphorical sense of the four primordial creative principles, yet there were no attempts to provide any experimental evidence in favor of their existence [9, 10]. As it will be shown in this paper, only by uniting the ideas of time, elements and emotions it became possible to verify the hypothesis of the four elements. For that purpose, it is essential to add the next term – "aspects." While this word is usually connected with angles, in astronomy aspects and angles are identified with time, because the usual way to measure astronomical time is to measure the angles: either between different celestial bodies or between the hands of the clocks [11, p. 40].

For me the word "angle" provides a kind of the closure in the title: we began from the definitions of different times and we conclude with measuring and evaluating them. In my opinion, temporology belongs to interdisciplinary fields and as such it reminds an emergent feature of a complex system. When we have enough patience to persist and to consider all its constituents, the whole system becomes more significant than the sum of its parts. I hope that after discussing all the following sections we shall gain new knowledge about the temporal aspects of our Whole-Self in general and of Prenatal Psychology, in particular.

Most importantly, the complex system presented here is both of theoretical and practical value. For more than three years I have been conducting a weekly course on temporological studies in Haifa, and many attendants report that this new holistic approach helps them to develop more harmonious relationships with their families, with friends and with themselves.

So, keeping in mind the whole plan, I invite you on a fascinating journey into the endless world of time and its corresponding Birth potentials.

1. Is Time an Illusion?

We have come to the end of the road paced by Galileo and Newton, which presented us with an image of a time-reversible, deterministic universe.

Ilya Prigogine

I have measured out my life with coffee spoons.

T. S. Eliot

Temporology studies definitions of time, timing, cyclicity and everything that is related to this topic, including the meaning of times, stages and periods in our lives. Obviously, the course of our lives from our birth to the moment of death comes with changes in our age and in our mental and emotional development. All this relates to time. What are the dynamics of our lives? Are there any temporal laws? If there are such laws, how can we discover them? Can we implement them? And what is especially interesting from the point of view of Prenatal Psychology: when do we actually start living? This isn't a simple question.

Everybody talks about time, but everybody understands it differently. The variations are so far reaching that the very definition of time remains elusive. Even the modern timekeepers admit that "we do not know what time is" [11, p.1]. Today the term "time" has a broad spectrum of meanings, which refers to a long list of distinct temporalities, such as day, month, year, season, duration, moment, instant, era, age, period, timing, cycle and frequency. When modern scientific and philosophical texts try to encapsulate all these temporal expressions in the single abstract term "time," such reductionism leads to oversimplifications. The problem is that there is NO DEFINITION of time, and therefore both ordinary people and scientists are dealing with different issues as if they were THE Time.

Modern physicists like to quote Einstein's famous sentence: "For us, practicing physicists, the division into past, present and future is merely an illusion, albeit an obstinate one." The Italian theoretical physicist Carlo Rovelli has even developed his physics without time, where the only reality is the gravitational field, and the flow of time is just an illusion [12].

Paradoxically, in his CNN interview he revealed that for him personally time means "suffering." Suddenly he changed his modern physical vocabulary to an ancient Arabic tradition, where Time became a synonym of a cruel and merciless ill-fate.

Other physicists and philosophers do not necessarily share such views. For example, the American theoretical physicist Lee Smolin and the Brazilian philosopher Roberto Mangabeira Unger argue that time is real and that physicists have rejected its reality because they are confusing an ideal mathematical model with the complex observed world [13].

Richard A. Muller – an eminent experimental physicist – does not make things simpler when he asks provocative questions: When we say the word *now*, what do we mean? [14]. Indeed, in different scales we mean either a short *now* of an instant moment or a historical *now*, which can last a few decades; for evolution *now* means millennia, and for geological sciences *now* can last millions of years.

It means that to define different *nows* we need different clocks. But can we define a clock? On the one hand, scientists say that "a clock is a device for measuring time, it is one whose law of motion is known." On the other hand, the current tendency to associate time with duration led to a circular statement that "time is what is measured by a clock" [15, p. 5].

Is it indeed true that we can measure something without defining it first? Can we differentiate between "duration" and "aging"? Can we measure the periods of time between events without either knowing what the instant of time is or without having a clear concept of events and processes? And what about that important choice of timing, described by Francis Bacon in his famous quotation: "To choose time is to save time; and an unseasonable motion is but beating the air"?

On the one hand, it is assumed in physics that we can replicate any experiment any number of times observing the same regularities, which we call the fixed laws of nature. In this view, the experiment becomes a kind of timeless event, which can be conducted with the same results at any initial timing regardless of the historical epoch. On the other hand, in our daily life we believe that "timing is everything."

On the one hand, we used to think of ageing in such a way as it is reflected by our solar or lunar calendar year (the so-called Watch-time). On the other hand, our real aging is only loosely reflected by such a calendar. Take, for example, progeria syndrome – a genetic disorder in which symptoms of premature aging appear at a very early stage. Those born with progeria usually die at their teens; their physical bodies remind those of elderly people. and they look and feel much older than their parents. It means that our ontogenetic, physiological "Age time" is not necessarily coordinated with the ordinary "Watch time."

It should be remembered that physicists are, first of all, human beings, and therefore they also feel an acute need to change our attitude to time. Thus, the astrophysicist, theoretician and cosmologist M. Lachièze-Rey addressed scientists with an emotional plea: "Analyze the world with the well-defined notions of duration, causality, motion, evolution...but forget time!" [16, p. 209]. The founder of the Chronos – The Institute for Time Nature Explorations – the biophysicist A. P. Levich showed that "Clocks are based on totally different physical principles and they are not necessarily reducible to each other... there is a growing necessity for clocks, not to be synchronized with some physical standards" [17].

So, let us ponder a bit on a question: what are the historical roots of the modern model of time as a real line? Why did Newton declare that time was abstract, linear, uniform and continuous, and why did he relate it to motion in such a way that time became redundant in physics? Imagine for a moment an archer with his bow. The very moment that he releases an arrow, its trajectory can be predicted by physics with the great accuracy. Such an event reminds a laboratory experiment in the isolated and unchanging domain of space-time. It presumes the creation of an isolated bubble. When all the objects in such a closed system have unchanging properties and all the processes are controlled by fixed laws, we may say that everything is predetermined in this domain by a single changing parameter T , and there is no place left to any

acts of free will. This single algorithm becomes a kind of almighty Lord of this domain, and that kind of lordship is defined sometimes from the reductionism point of view as THE TIME. It is that merciless kind of duration, which transforms physics into pure geometry, and which is referred to in Shakespeare's Sonnet 19: "*Devouring Time, blunt thou the lion's paws.*"

Nevertheless, from the wider hierarchic approach, a laboratory domain forms a sort of sub-universe with the stipulated initial conditions [18]. An arrow does not have a free will, but the archer does. The bubble with its strict temporal laws was created AFTER the archer's decision to release the arrow. Then and only then the duration of the arrow's flight becomes predetermined. But such Time or duration cannot influence the archer's free will. That kind of time cannot define when and how the archer will release or not release his arrow. The system "archer-arrow" should be treated as a complex system with bifurcations, and its description should imply both deterministic and probabilistic elements. Nevertheless, from the modern scientific point of view, it appears as if the archer's timing is intrinsically chaotic and cannot be restricted by any law. Such contrast between deterministic view on THE Time and, on the contrary, conviction that free will is completely unpredictable, led Ilya Prigogine to suggest that science should rediscover time. He wrote: "The study of complex systems (including, for example, biology and the human sciences) may reveal features of natural law that are just as fundamental as are those disclosed by physics and chemistry in the study of simple systems" [19, p. 261].

Mathematically, it would be convenient if time and duration were real numbers, yet in the life-sciences such oversimplification is not true. Unlike the abstract linear concept of the Eddington's arrow of time, in the life-sciences various phenomena have recorded various cycles, such as diurnal, lunar or annual [20]. When time measurement was based upon astronomical observations, the primary standard was provided by celestial motion. This situation changed in 1972, when the measurement of time became officially rested upon hyperfine transition of cesium. On the one hand, we now have fast man-made atomic clocks, which provide a standard of frequency, but cannot determine the interval elapsed since any initial epoch in the past. On the other hand, our calibration of mundane clocks remains dependent on astronomical observations, as no artificial clock can be indefinitely sustained in continuous operation in the manner of the celestial motions.

In addition, our calendars should be constructed so that their months will always fall in their appointed seasons. To coordinate between the atomic clocks and different natural processes, such as the growth of plants or the migration of birds, we must introduce occasionally the leap seconds, days or months, depending on different kinds of celestial motions and rotations in our solar system. As a result, the modern timekeepers, responsible for the atomic clocks, confirm the fact that we have moved into an era of multiple time scales [11]. In other words, our life is not governed by the atomic clocks, but by the most ancient natural clock: the starry sky with its quasi-cyclic motion of the celestial bodies. Furthermore, what is missing in a modern notion of "time," but is present in the life-sciences, is the element of uneven rate of flowing of different times as defined by different natural clocks.

In order to illustrate this, let us consider the usual way of marking a date and timing of a meeting, such as that of our congress in the Netherland:

Friday, September 13, 2019 (or in European manner: 13. 9. 2019) at 14.30 in Bovenkarspel.

As we see, the date of an event in the scientific sense is a whole set of alpha-numerical data. In this set the names of the specific day of the week and the month (**Friday & September**) are as important as the ordinal numbers of the days and the year (**13 & 2019**). Elsewhere [18, 21] it was shown that such a date is not a real number, but a set of strings specifying the types and sequences of processes taking place in a given space-time interval. I called such alpha-numerical string "**time-codons**" (TC). In these terms, to plan an appointment or to calculate intersection of two complex systems in a given space, we need to use a TC based on dates (years, months, days), watch-times (hours, minutes, seconds) and possibly even atomic times (fractions of

seconds). The question remains: why shouldn't we present the dates or times in a simple numeric or decimal notation as is shown in the following line?

$$a_{n-1} a_{n-2} \dots a_1 a_0 , a_{-1} a_{-2} \dots a_{-m} = \sum_{k=-m}^{n-1} a_k 10^k$$

In modern times there were a few futile attempts to change the time-keeping units. An interesting attempt was made in France, where a decree was issued on 24 November 1793 with the intention of imposing a decimal division of the day, but it was suspended already on 7 April 1795. So, again, why do we, for instance, continue to subdivide the day into hours, minutes and seconds in a way inherited from the Babylonians? And why do we use incommensurable processes as a set of our reference clocks?

One of the obvious reasons for such a resistance to decimalization is dictated by the natural human habits and responses, which are adjusted to the geophysical daily, annual and lunar cycles [20]. Accurate calendars and timings are essential for any kind of personal and social activities in more ways than one might imagine: they can define our inborn potentials as well as our abilities to plan and anticipate the future. Unlike physics, which deals not so much with bodies as with their trajectories, for the life-sciences time is tightly connected with cycles in general and with circadian rhythms, in particular. Unlike the uniform physical time, multiple biological rhythms describe different kinds of events, taking place on several temporal scales. For example, the evolutionary biologist J. B. S. Haldane (1892-1964) has introduced several different scales for the study of various biological processes, such as molecular, physiological, ontogenetic, historical and evolutionary [22]. To describe such a complex structure the prominent physicist David Bohm (1917-1992) proposed the multilevel model of time. According to him, "a good analogy is to consider a radio wave carrying a television program. The very fast radio wave contains enfolded within it the much slower times that are depicted in the program" [19]. And he continued: "There may be biological *times* of various kinds, neurophysiological times, psychological times (both conscious and unconscious) going on, perhaps on levels of which we have as present no notion at all. Each of these levels of time is a relatively independent and autonomous context" [19, p.198]. In other words, in the life-sciences different processes constituting life may belong to different hierarchic levels and be described by their specific and larger time scales characterized by different clocks, cycles and metrics.

Back to Einstein, I'd like to quote his words about the time written in his last book *The Evolution of Physics* (1955):

"The psychological subjective feeling of time enables us to order our impressions, to state that one event precedes another. But to connect every instant of time with a number, by the use of a clock, to regard time as a one-dimensional continuum, is already an invention."

The first sentence in this quotation strongly suggests the possibility to establish (at least subjectively) a sense of the causality. Nevertheless, the second sentence stresses that our linear concept of time is just an invention, and as such, while it might be useful for certain problems, it might not have the universal nature.

In a series of scientific publications, it was proposed by me to introduce such a model of the Generalized Time (GT) that will employ different processes as our reference clocks and become an effective tool for the studies in the life-sciences and humanities as well as in the natural sciences [18, 21, 23].

Qualitatively, "Generalized Time" (GT) is defined as a manner of marking the events or processes and a way of arranging, ordering or coordinating them.

Such GT is seen as an operator or an algorithm interconnecting and ordering different processes and/or their phases.

Quantitatively, the GT of a complex system can be characterized by so-called **time-codons** (TC): that is by **alpha-numerical strings** of measured, calculated, evaluated or even ad hoc assessed relations between different sub-processes. While duration in a laboratory experiment

is usually a **one-dimensional parameter**, TC might be an **n-dimensional construction**, where n is a necessary and sufficient number of subprocesses, chosen as reference clocks and able to characterize the dynamics of a studied complex system.

This concept of time-codons enables us to construct diverse scales or algorithms by means of which the individual existence could be integrated in the larger schemes of social or cosmic systems of the external world. Knowing whether a certain model of time matches the reality depends solely on revealing the true nature of the processes. The important criterion of a correctly selected set of reference clocks: **There should be no conflict between the scientific laws of nature and the temporal observations as long as both of them depict the existing reality of our world.**

From the practical point of view, today mundane or historical time is expressed in dates, but historically different cultures used different man-made clocks for reckoning mundane times. To unite all these chronological dates, we need to find a reliable way to mark and measure any specific moment of *now*. The laws of motion of long-lived heavenly bodies provide us such methods, because they persist over the large epochs and are confirmed by the vast number of past observations and records. Historically, people learned to mark each day by the respective placements of the planets in 12 zodiacal constellations [24]. Specifically, it was shown that by marking the relative positions of the 10 known celestial bodies of our Solar systems (The Sun, the Moon, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto) we can uniquely define each day throughout all the known history of humanity [2, 21].

This led us to propose the following TC for time reckoning, in which θ denotes an angular position of the corresponding celestial body,

$$T = \{\theta_n\} = \begin{pmatrix} \theta_{sun} \\ \theta_{moon} \\ \theta_{mercury} \\ \theta_{venus} \\ \dots \\ \theta_{pluto} \end{pmatrix}$$

It should not be surprising that such TC does not remain an abstract concept but reflects natural laws of the existing space-time processes. The unique role of the celestial bodies and stars as coordinating the seasons and predicting typical weather conditions has been recognized from the ancient days. The predictable courses of the celestial bodies were traditionally used as meaningful reference points for constructing long-term calendars. Historically, in astrology and in cosmology Birth Points were also marked and denoted by the respective placements of the planets in 12 zodiacal constellations [24]. Yet the details of the related Birth Potentials in the traditional astrology are very complex, and they are based on the analysis of all the relative motions of the celestial bodies in our solar system. To make the initial analysis simpler, it was proposed at first to compare Birth Potentials of well-known deceased people who shared the same Birth Points.

2. The Effect of Celestial Twins (ECT).

... the hypothesis that both were born not only on the same day, but also at the same hour ... would imply that, as well as seeing the light at the very same moment, they would, at that very same moment, both have experienced crying for the first time too.

Jose Saramago

In 1993, I began to study and compare life-paths of the well-known "celestial twins" (people who were born simultaneously or within a time-interval of less than 48 hours). Back then I could not imagine that this systematic study would last more than 25 years and that its results would be summed up in a monograph titled *Celestial Twins* as well as in a series of scientific papers. Also, I could not imagine that in 2018 I shall be awarded a Diploma of the Israeli Association of Inventors for the scientific discovery of the Effect of Celestial Twins (ECT). This Diploma states:

"Based on the available biographical data on the lives of historical personalities born on the same day of the same year, the effect of "synchronicity" has been established and theoretically substantiated. It manifests itself in a high degree of similarity in the characters and life-paths of the "celestial twins," i.e. people born simultaneously in different parts of the world. New interrelations of social and cultural phenomena, caused by the temporal factors on historical processes, are revealed."

What is especially important for the field of prenatal psychology is that in many cases comparative biographies reveal that the pre-birth stories of the well-known celestial twins are closely interconnected. Seen together, they reinforce each other making each other seem to be unavoidable consequences of certain temporological laws. This issue was discussed in detail in my chapter in *Prenatal Psychology – 100 Years* [26]. Here I shall present just a brief sketch of celestial twinship.

In his *Autobiography*, Goethe has observed that "any person born ten years earlier or later would have been quite a different being, both as regards his own culture and his influence on others" [25, p. 17]. It means that the *Zeitgeist* would be felt differently by those who were born in different historical periods. In other words, the Theta-factor or a BP of a human being able to originate a new idea, is important: it signals a potential change in history and may reveal a significant development in the culture. If so, the reverse should be also true: those who are born simultaneously with each other might be exposed to more similarities in their environment and they might influence their environment in more similar ways.

From the ancient days of King Solomon to the modern times of Mark Twain's romance *The Prince and the Pauper*, there were numerous legends and folk stories about entwined destinies of people who shared the same date of birth. As an example, let us remind the so-called "mystery" of *The Cholmondeley Ladies* – the early 17th-century hypnotizing oil painting from the Tate Gallery. At first sight, it seems that it depicts two identical women (supposedly twins) and their two identical babies. According to a golden original inscription, it shows "Two Ladies of the Cholmondeley Family, Who were born the same day, Married the same day, And brought to Bed the same day." On closer inspection, it is obvious that, despite amazing physical resemblance, those ladies are not identical twins. The puzzling fact that they shared the same birthday, the same appearance and the same destiny could be hardly explained by a set of numerous coincidences [27]. Yet, what seems to be a mystery from the genetical point of view, becomes an expected phenomenon from the point of ECT view.

Another mysterious example of the unbelievable resemblance of the celestial twins is the well-known story of the Italian King Umberto I (1844-1900). One day of July 1900 the king was eating in a restaurant when he noticed that the owner was his near-exact physical double. It emerged that both were born on the same day, in the same town, and had married women with the same name Margaret. The restaurateur had opened his establishment on the day of Umberto's coronation. Eventually Umberto was shot dead on the day he learned the restaurateur had died in a shooting.

It is very interesting that such kind of a "mechanical" clock-like simultaneity between the celestial twins was suggested already by the Jewish medieval sage Abraham Ibn Ezra in his *Sefer ha-Moladot (Book of Nativities)*:

"If two children are born at one and the same time and in the same city, one of them the son of a member of the royalty and the other the son of a servant, and the horoscope of both of

them predicts that that they will ascend to high social rank and assume supreme power, then the son of a member of the royalty will become a king and the son of the servant will become a merchant" [28, p. 349].

It should be remarked that for Ibn Ezra's times this was quite a bold statement. Ibn Ezra's contemporary astrologers usually denied any possibilities of the similarities even between biological twins, not to mention between astrological ones [24]. The main problem which arises when we discuss similarities and differences in the life-paths is that there are no metrological rules for establishing the degree of similarities and contrasts. One might say that the king's son in Ibn Ezra's example is completely different from the merchant's son. Yet the others might see the similarities (or rather "isomorphism") in the similar processes taking places simultaneously in the lives of celestial twins.

Many thinkers and astrologers had tried to explore similarities and contrasts of the astrological twins, but there were no solid facts confirming historical legends. *Celestial Twins* became the first evidence-based major work which establishes the historical truth behind such myths.

Methodologically, the ECT studies belong to an interdisciplinary field of science – the study of twins – founded by Sir Francis Galton (1822-1911). Galton suggested that twins should not be considered just a source of wonder and fascination, as they had been since the beginning of recorded history, but rather a subject for scientific study. He considered twins "a kind of natural experiment which permits us to distinguish between the influences of heredity and environment." His twin method led him to conclusion that the similarities between identical twins can be explained by identical genes [29].

However, genetics alone cannot explain the observed similarities either between different-sex or fraternal twins. A vivid example of such similarities was given by William Shakespeare in his romantic comedy *Twelfth Night*. The play tells an amazing story of Viola and her twin brother, Sebastian, whom she believes to be drowned in a shipwreck. Yet Sebastian survives, and this fact causes the problem of twin characters whose identity is mistaken by the other heroes of the play. This happens because Viola has decided to disguise herself into a man. Of course, the twins in this play are not identical, because they are a girl and a boy, but their resemblance as the celestial twins makes Viola to be mistaken for Sebastian. According to Galton's model of "nature" and "nurture," there is a possibility that Viola and Sebastian owe their resemblance to their identical education. Surprisingly, it is not so. In a series of different studies of identical twins reared apart the scientists came to a paradoxical conclusion:

"The more separated the twins, the more similar they appear to be on personality tests. ... Twins with no contact were more frequently alike than twins with ample opportunity to 'identify' with each other" [30, p. 271].

In short, the non-genetic factors that have the greatest impact on shaping our lives are not related to the way our parents raise us [30, 31].

The existence of a non-genetical mechanism of resemblance between the fraternal twins or the identical twins reared apart might suggest a possibility that ECT belongs to a vast class of general laws of synchronicity, first described by C. G. Jung and the Nobel Laureate Wolfgang Pauli [32]. Steven Strogatz – an American mathematician – wrote: "What is breathtaking about the phenomenon of synchronicity is that it occurs at every scale of nature, from the subatomic to the cosmic. It's one of the most pervasive phenomena in nature, but at the same time one of the most mysterious from a theoretical perspective" [33, p. 200].

The celestial twins study suggests that just as biological twins reared apart are regarded as the natural experiment for the separation of genetic and educational factors, celestial twins may be seen as the natural experiment for differentiation between the genetic and Theta-factor (temporal) influences. As a result, the present approach suggests that both identical and

fraternal twins represent a particular case of celestial twinship. If so, symmetry between biological twins is caused not only by their genes, but also by their temporal Birth Point or Theta-factor.

During the preliminary stage of the celestial twins' study, the biographical data of about 15,000 historic personalities was collected and crosschecked. Rigorous rechecks of birthdates confirmed more than a hundred pairs of well-known celestial twins. From the time-codon point of view, they had almost identical positions for all the slower celestial bodies but could have slightly different positions for the faster moving Moon. (The Moon is traveling approximately 13° daily). Their biographies demonstrated impressive parallels between celestial twins alongside profound differences between the pairs with different Birth Points.

The next step was to write comparative biographies of the well-known celestial twins, those whose biographic material allowed detailed comparison of their lives from birth to death. Most of them, such as C.G. Jung or Ernest Hemingway, King George VI or Oscar Wilde were believed to have an unprecedented life path. And yet.... Each of them had at least one celestial twin who had the similar pre-birth history, similar calling and similar achievements.

Furthermore, in many cases it appears as if when one individual makes a discovery, his/her celestial twin consciously or unconsciously helps to spread and amplify it. That fact led me to characterize an isomorphism between the celestial twins as their ability to play similar roles in their social circles. To mention just a few examples from different fields:

In sciences. In 1913, two pioneer works concerning isotopes were reported simultaneously: one was written by Frederick Soddy, another by Francis Aston. Nobody seems to recognize what an incredible coincidence it was that these Atomic Age pioneers and Nobel Prize winners were celestial twins.

In medicine. Though separated from birth by geography, religion and genes, celestial twins Emil Behring and Paul Ehrlich were honored as "the children's saviors." Their joint work has saved millions of children from diphtheria, and both became Nobel laureates.

In peace-making activities. Although the Nobel Peace Prize recipients Louis Renault and Charles Albert Gobat were born in different countries (France and Switzerland, respectively), both celestial twins were jurists, both studied French law, and both choose a career in law, education and politics.

In music. Pablo Casals is considered the greatest cellist of the 20th century. His celestial twin, Lionel Tertis, is recognized as the greatest viola-player of all time. Both lived more than 97 years and enjoyed playing chamber music together.

In feminism and politics. In 1919, Nancy Astor became the first woman to sit in the House of Commons, replacing in this position her husband, Waldorf Astor, who was also her celestial twin.

From the psychological point of view, there is a very interesting example of a similar attitude to life of a pair of different-sex famous celestial twins, the Nobel Laureate in Literature, Ivo Andrich, and the outstanding Russian poet and writer Marina Tsvetaeva. Although Andrich is best known for his prose, his first published works were poems. Although most of his poetry was published posthumously, Andrich, like Tsvetaeva, continued to write poems during all his life [34]. Both lived in countries devastated by hatred, revolutions and wars, but what is most important is that both were seeking and praising death **even before** the times of calamities. It was characteristic for both celestial twins, that from their very youth the prevailing tone of their poems was marked by melancholy, despair and self-pity. The following Andrich's lament as if was written to reflect Tsvetaeva's life pattern:

"There comes a time when a man finds himself in front of a dark uncrossable abyss, which he himself has spent years digging. He cannot go forward, and has no way back. Words have failed, tears won't help, and who would he call out to?" [34].

The feelings of anxiety, guilt and horror were expressed in the poetry of both celestial twins. Tsvetaeva's famous line "*Wherever I look there is poetry, whatever I touch brings pain*" could stand as an epigraph to both her and Andric's poetry.

It is usually believed that nothing would seem more individual than poetic visions, moods and metaphors. It is also argued that they should drastically differ from language to language, from culture to culture. Therefore, it is especially surprising to find close resemblance between poetical lines written by different celestially twinned poets. The cross-cultural nature of this resemblance strongly suggests its temporal nature.

Another interesting case of celestial twinship is the story of Sully Prudhomme (1839-1907) – the first ever poet to receive the Nobel Prize for Literature. As a multitalented person with many interests, he studied engineering, philosophy, law and poetry. He worked in a solicitor's office, and after 1888 he turned from poetry to write essays on aesthetics and philosophy focusing on theoretical and metaphysical works.

Sully Prudhomme's celestial twin, John Butler Yeats – the father of the famous poet and Nobel Laureate, William Butler Yeats – was also multitalented person with many interests. Educated as a lawyer, he is known as an artist, a witty philosopher and a brilliant conversationalist. Yet his innermost quest was to serve poetry. He believed that "Real Poetry is Real Personality," and his greatest dream was bringing up his eldest son to be a poet. He studied astrology and this knowledge helped him to encourage his children and to nurture their talents. Indeed, William Butler Yeats became an Irish poet, a Nobel Laureate and one of the foremost figures of 20th-century literature.

Back to celestial twins, Sully Prudhomme and John Butler Yeats, both were said to be a rare combination of the qualities of both heart and intellect. John Butler Yeats is also a good example of the parental latent talents which are transferred to be expressed in the children.

Not all the parents are as supporting and understanding as John Butler Yeats. In *Celestial Twins* the archetypal story of Cancer is describing the dramatic lives of the Nobel Laureate in Literature, Ernest Hemingway, and one of the greatest poets of the Lost Generation, Hart Crane, both of whom suffered from self-destructive behavior and eventually committed suicide. The joined story of these emotionally gifted celestial twins shows that the mothers' frustrations and a tough style of parenting is very dangerous to such individuals and may become a source of frustration in adulthood. The detailed analysis showed that in both families the parents' own feeling nature was crippled, and the problems of their own low self-esteem did not allow them to understand the needs of their babies. In that case, it would be pointless and even cruel to blame parents, who were themselves suffering from deprivation and depressions. We cannot change the past; we cannot prevent the tragedy that at the age of 57 Hemingway's father shot himself to death, and three of his children would also eventually commit suicide. Nevertheless, there is a new hope for new insights and new conscious approach to marriage and parenting [26]. I hope that a new approach to our personalities will help future parents to lessen family stresses and violence, preventing many potential suicide attempts.

Continuing the theme of the psychological impacts of the celestial twins' study, I'd like to discuss briefly the issues of cooperation and competition between the very similar people. In his novel *The Double*, the Nobel Laureate Jose Saramago vividly described a lighting instant of grasping a new phenomenon when his main character understands that a similarity between him and his double is not bound to a single coincidence or a series of chance events, but is rather a life-long process or a natural law that is difficult to decipher. He suddenly knew "that

one of us changes not because the other one changes, but because any change is simultaneous. Saramago even suggested a new kind of "sociocultural" instinct, implying that "any idea that had occurred to one person would necessarily, occur to someone else."

Saramago wrote a fictional story, and he decided that celestial twins unavoidably should become enemies, and their meeting should force them to annihilate each other.

On the contrary, the American journalist Marlo Morgan in her bestselling book *Mutant Message Down Under* describes an enlightening experience of her "chancy" meeting and cooperation with her aborigine celestial twin named Black Swan. She wanders: "What are the chances of meeting someone else who is born the same day, same year, and same hour, on the opposite end of the earth, and having the knowledge foretold?" Her message strongly urges us to respect the right of all human beings to exist and the necessity for cooperation – rather than competition – to bring peace, knowledge and beauty to the world.

Numerous stories of well-known celestial twins support the idea of the cooperation. Such amazing parallel life-stories as that of the musicians Lionel Tertis and Pablo Casals, who played chamber music together, or of the Nobel Laureates in Medicine, Emil Behring and Paul Ehrlich, reveal the advantages of the voluntarily cooperation and the strength of the celestial twinning bonds. Celestial twins can learn the hidden laws of Time and the laws of their Birth Potential. As a result, they become aware of the need of cooperation instead of competitiveness.

To sum up, the ECT challenges many long-held beliefs. It shows that the roles of genes, race, gender and cultural background are not as strong as is believed and that the Theta-factor is not less important for shaping identity than the genes or the early environment.

In conclusion, I'd like to quote two Theta-factor laws:

The factor of birth time, Theta-factor, is a third factor – in addition to heredity and environment – influencing human personality and destiny.

The celestial twins represent simultaneous events and have isomorphic lives. Though each human being is unique, each group of celestial twins might be seen as M. Escher's picture *Circle Limit III*: at first glance each fish there is different; there are big fish and small ones; there are distorted and rotated fish; yet the motif is the same, and the whole is more than the sum of its parts.

Maurits Cornelis Escher (1898-1972) was a brilliant Dutch graphic artist who made mathematically-inspired woodcuts, lithographs, and mezzotints. During his life, his original and pioneer work was not appreciated enough. Such exceptional novelty and postponed recognition are characteristic for most of the representatives of the Phoenix Hour generation born between 1885-1900 years. That leads us to the next section.

3. The Phoenix Hour

The great cycle of periods is born anew.

Virgil

History saves its major turning points for the right timings and makes these rare peaks short and countable. The poet's mission is "to serve as a pulse in the temples of history."

Octavio Paz

The fact that the celestial twins reared apart had a similar pre-birth family history, as well as a similar early environment, and a similar physique combined with similar major modes of expression, strongly suggests that Theta-factor denotes more than the qualities of a single personality. It was suggested that the Theta-factor denotes a phenomenon resembling Whitehead's "natural unit of historic fact" and therefore might be used for constructing a cultural historical calendar.

In his *Faust*, Goethe wrote that "Anyone who cannot give an account to oneself of the past three thousand years remains in darkness, without experience, living from day to day." From the historical point of view, it means that without gaining a proper perspective we shall not be able to anticipate the future and shall be doomed to live from day to day, repeating the same patterns without learning from the past experiences. But how can we grasp our past? History presents it as a series of discrete episodes, each of which can be considered either "an event" or "a process." As a rule, events and processes cannot be separated from their temporal aspects. Historians and archeologists are concerned with the fact that history is not built at a single temporal scale, but rather employs various short-term and long-term methods of dating. As a result, it is very difficult to distinct between events and processes: seen at different time-scales, they might become interchangeable. Consequently, the historical sciences remind a description of a random collection of events flowing as a chaotic stream.

To interpret the distant times and historical processes, contemporary chronology heavily relies on astronomical models of eclipses and on the Metonic cycle, a period of about 19 years, after which the lunar phases (defined by the angle between the sun and the moon) recur in the same order. This cycle has been used for constructing an accurate solar-lunar calendar, reflecting seasonal changes. Yet in respect to the slow rate of historical developments, this cycle is too short. In addition, it does not reflect the observed peculiar dynamics of the high and low tides of cultural evolution [35].

In the 18th century Joseph Priestley became the first to lay out systematic principles for the organization of historical data into a visual medium and presenting different historical phases in quantitative terms. His famous *Chart of Biography* marks the birth data of two thousand famous historical figures across the three millennia. The results illustrate that different generations are very different in the ways in which they experience creativity and in which they express it in their lives. It means that to become an influential thinker it is crucially important to be born in specific periodical intervals or epochs. All the other times (decades or even centuries) are relatively non-eventful periods, when the rates of birth of prominent cultural figures are much lower [36]. Priestley's chart was very helpful in understanding of the uneven rate of historical times, but it could not provide a set of appropriate long-term reference clocks.

The first attempts to construct meaningful historical calendars were described by such Medieval scholars as Abraham Bar Hiyya and Abraham Ibn Ezra. They proposed to construct calendars based on conjunctions between various celestial bodies. In particular, they dealt with the collective fate of mankind by means of analyzing "periodic conjunctions of Saturn and Jupiter as divided into three main groups: great (960 years), middle (240 years) and lesser conjunctions (20 years)" [28, p. 68]. It was found that some special conjunctions of Saturn and Jupiter were accompanied by the birth of influential historical figures [28, p. 69]. Ibn Ezra also reached the conclusion that the three types of Saturn-Jupiter conjunctions, together with annual revolutions of the Earth, "hierarchically mark the rhythm of human history at almost all its levels" [37, p. 21]. Ibn Ezra also argued that in case of slowly moving planets with the "noble ratio" between their periods of revolutions, such calendars will result in a comprehensive picture of the human history [37, p.18].

In *The Phoenix Clock* such a calendar based on the Pluto-Neptune conjunctions with a period of about 493 years, was constructed to describe the cultural developments in humanity [2, 18, 38]. Significantly, such periodicity is compatible with J. B. S. Haldane's evaluation of the time scale needed for the study of historical processes. I called this historical and cultural calendar the Phoenix-Clock model. This name is taken from the ancient mythology. It symbolizes both an endless stream of life and its long-term cyclic nature. All over the world the Phoenix is known as an immortal creature. Instead of dying, every 500 years this bird is reborn in flames. In the Roman Empire, the Phoenix denoted an eternal cycle of blessedness. Since the days of Marcus Aurelius, it was even suggested that "time is born like the Phoenix in a great cyclical cataclysm" [39].

There are two major differences, which distinct this model from all the other chronological approaches. First, in the spirit of Priestley and of the ECT, the Phoenix Clock model marks major historical or cultural events as the dates of birth (BP) of the personalities, responsible for these developments. As a result, the numerous historical facts are reassigned to the Birth Points (and the corresponding time-codons) of their initiators. Such a view matches Octavio Paz's idea that man is not "in history: he is history." It also matches the Whole-Self approach, because the Phoenix Clock model puts in the center of creation a responsible person and not a blind incident.

The second difference is in substituting a short-term solar-lunar calendar with a longer-term Neptune-Pluto cycle. The uniqueness of this Pluto-Neptune resonance system consists in the fact that for every two orbits around the sun completed by Pluto, Neptune completes approximately three orbits. As a result, the aspect between these two planets, as it is observed from the Earth, is nullified periodically, once in about 493 solar-lunar calendar years. Such period between two consequent conjunctions was called the Phoenix Year [2]. In accordance with Ibn Ezra's predictions, it was shown that each time during the recorded history of the humankind when the angle between Neptune and Pluto stayed within 10° (this conjunction I called a Phoenix Hour) a new generation of revolutionary-minded creators, poets and scientists was born. Metaphorically, a Phoenix Hour is associated with eclipses. Historically, it lasts in our epoch about 15-16 years, and last time it was observed between 1885-1900. Culturally, it marks a point of rupture, according to which developmental and social processes of a new era are calibrated.

Applying structural analysis to a period covering over three thousand years of world history reveals a complex rhythmic temporal pattern, showing that creativity did not flow at an even rate but had its periods of acceleration and stagnation. In particular, striking correspondences were found between the rate of birth of influential poets and the phases of the Phoenix Year.

Astronomically, like the Metonic cycle, the Phoenix Year can be divided into eight phases, from zero (the conjunction) to VII, by measuring major aspects between Neptune and Pluto. Figure 1 illustrates these phases for the two subsequent Phoenix Years, which occurred between 900 to 1891 years A.D. The solid and dotted lines represent respectively Neptune's and Pluto's observed angles with respect to their meeting point on the ecliptic during an eclipse. The discrete points on the graph show the observed angle between Neptune and Pluto. Due to Pluto's elliptic orbit, this angle, which can be regarded as an emergent property of this system, is changing irregularly. Although an inner structure of each Phoenix Year is periodic, it follows a peculiarly changing pattern in relation to the usual sun-lunar chronological dating. The length of each phase is different from the other phases and it also changes drastically from cycle to cycle. Consequently, this cycle is both ever-constant and ever-changing: while its total length is not changing, its inner structure is unique for each cycle. [38, 40].

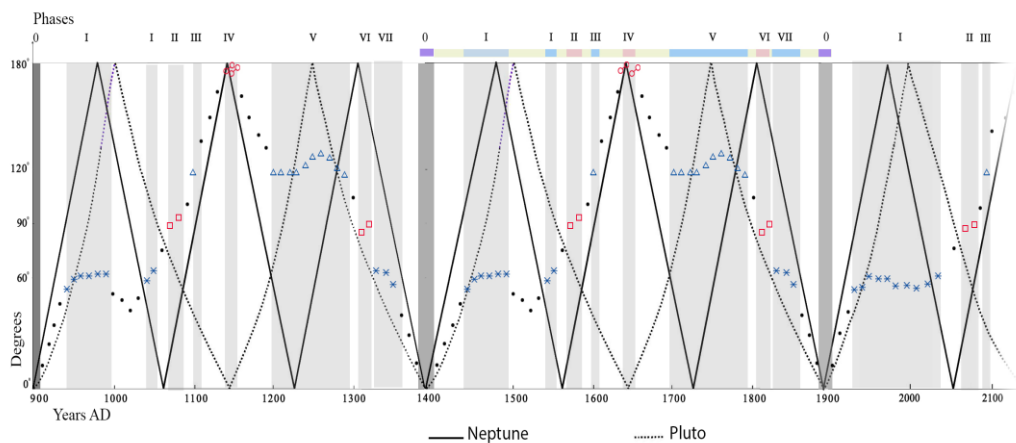


Fig. 1 The Structure of the Phoenix Year

It was found that at different phases of each Phoenix Year, human cultures develop in radically different ways. People born during different phases of a Phoenix Year are exposed to different dominant ideas of their respective *Zeitgeisten*, which are changing from phase to phase in a way reminiscent of the eight stages of human life. Historically and culturally, these stages reflect Francis Bacon's belief that ideas, like people, have their age periods – birth, youth, adulthood and death.

Each Phoenix Year is starting with the disruptive *zero-phase* – the Phoenix Hour, which, like a new Moon, heralds a chronological leap, a birth of a new and different types of our perception and attitudes. Creative people born during a Phoenix Hour are associated with revolutionary spirit, originality and novelty. Usually they witness the emergence of something unpredictably new and take part in a genuine and incontrovertible transformation and becoming. Looking at such short periods, modern historians are frequently at a loss to explain the difference between the volcano-like eruptions of new ideas during these decades and the previous sleepy barren uneventful centuries marked by the absence of any significant thought.

Many of the paramount events in the human history (both civic and creative) matched up repeatedly over multiple Phoenix Hours. These periods included, for example, the foundation of Caesar's kingship in the first century AD and the fall of the Roman Empire in the fifth century. They also included those pivotal historical ages in the ancient and medieval history when, according to the philosopher Karl Jaspers (1883-1969), new ways of thinking appeared during the so-called first and second Axial Ages [41]. Such ingenious thinkers as Pythagoras and Confucius were born during the Phoenix Hour of the 6th century BC. During the next Phoenix Hour of the 1st century BC, such Rome's greatest poets as Virgil and Horace were born. During the previous millennium, the first Phoenix Hour occurred from 1380 to 1409 AD. Then the precursors of the Early Renaissance, the inventors of printing and the messengers of the Age of Exploration were born. The closest to our times Phoenix Hour occurred between the years 1885-1900. Then the fathers of quantum mechanics, the originators of cybernetics and the pioneering aircraft designers were born, which radically changed the lifestyles and world views of the future generations. As a rule, all the Phoenix Hours were the times of painful crises followed by violent revolutions, which constituted a sort of a natural "zero point" for social and creative narratives of various types.

The following first half of the Phoenix Year, when the angle between the Pluto and Neptune is less than 180 ° (this opposition is associated with the Full Moon), reminds the waxing Moon. During this time there is a need for long intellectual incubation before the new paradigms are accepted. This period, which lasts about one Pluto or 248 solar years, was named a Pythagorean era. This era includes the following stages:

The first or "waxing crescent" phase comes when the Pluto-Neptune angle is about 60°. It is the time of infancy and childhood of an idea.

The second or "the first quarter" phase comes when the Pluto-Neptune angle is about 90°. It is the phase of adolescence, accompanied by various upheavals.

The third or "waxing gibbous" phase comes when the Pluto-Neptune angle is about 120°. It is the phase of early adulthood and flourishing.

The second half of the Phoenix Year, which is called an Epicurean era, resembles the four phases of the waning Moon, beginning with the Full Moon and ending with the new Neptune-Pluto conjunction, a kind of New Moon of the subsequent cycle. People born during such eras are remembered mostly for improving and widening our pre-existing views. This era, which also lasts about 248 solar years, includes the following stages:

The fourth phase comes when the Pluto-Neptune angle reaches 180°. It is a midlife crisis which challenges original paradigms.

The fifth or "waning gibbous" phase comes when the Pluto-Neptune angle is about 120°. It is the period of mature adulthood of the golden age of enlightenment, when initial ideas are proudly entering the academies.

The sixth or "third quarter" phase comes when the Pluto-Neptune angle is about 90°. It is the crisis of the onset of old age, when the initial ideas become weary, but are still refusing to give place to new tendencies.

The seventh or "waning crescent" phase occurs when the Pluto-Neptune angle is about 60°. It is time to drop the initial ideas, while nevertheless preserving their seeds of wisdom for the younger generations.

At the end of each Phoenix Year there are multiple new and exciting ideas in the air. They are so weird and novel for the current times that their implementation should wait for the birth of the next generation of the coming Phoenix Hour.

Following this cycle, the eighth phase should be the next Phoenix Hour, or the zero-phase, reminding the previous one but with the meeting point shifted about 5-6° along the ecliptic. Due to this shift, a Phoenix Hour resides in each of the 12 Zodiacal Signs for about 2500 years, and due to the elliptical orbit of Pluto, all the phases of the Phoenix Year will change their durations from cycle to cycle.

The proposed Phoenix Clock model has been successfully applied to the chronological analysis of ancient Egypt and Judea, Greece and Rome; to the survey of the European Renaissance and to the history of Portugal, including its language, its poetry and its legendary Prince Henry the Navigator, known as the main initiator of the Age of Discoveries [2]. Such mapping of historical narratives of one specific country is especially important because the history of Portugal is well documented and extensively studied over the past thousand years.

As a result, the qualitative and speculative theories of Francis Bacon, Johann Gottfried Herder or Oswald Spengler, which have predicted periodicity in birth and decline of civilizations, suddenly turn out to be tangible, quantitative and measurable.

From the psychological point of view, it is most important to stress that the spirit of the messages of all the "Phoenix-born" generations (to shorten the text I shall use this abbreviation to denote people born during a Phoenix Hour) remains unchanging: it ponders the meanings of life, death, rebirth and cyclicity, thus reminding us of the mythological Phoenix bird. Let's illustrate it with a few poetical lines:

Marina Tsvetaeva exclaimed: *"I am the Phoenix; only in the fire I sing!"*

Nelly Sachs lamented: *"Life was like a knife between life and death."*

St-John Perse reflected: *"The Poet himself comes out of his millennial rooms."*

"And you had so little time to be born to this instant..."

Boris Pasternak declared: *"We used to be people. We're epochs."*

Virgil observed: *"The great cycle of periods is born anew."*

Pär Lagerkvist summed up: *"The spear has been cast and will never fly back."*

Elsewhere I have discussed the typical stories of the famous Phoenix-born scientists and poets [2, 38, 40]. Here I'd like to focus on some of the pre-birth experiences of such generations.

In my time-related researches I have compared hundreds of extensive biographies of the well-known personalities all around the world. What struck me most was that till the 20th century scholars and biographers did not ascribe any importance to the prenatal and early phases of human life. As a rule, children were not mentioned in Greek philosophy or in Latin poetry. Their intellectual and emotional needs were not taken seriously either by the society or by those who should take care about the babies. Certain kids were lucky to have rich opportunities to learn; the others – and their numbers could reach at certain periods in Europe about 80% – were destined to die from the epidemics or the emotional neglect in their babyhood [26].

A turning point in human consciousness occurred when researchers became interested in the details of the early family life. Among the first scientists who became aware of the crucial importance of these periods were the psychologist Jean Piaget (1896-1980), the psychoanalyst Anna Freud (1895-1982) and the founder of the ISPP Gustav Hans Graber (1893-1982). They belonged to the unique generation of the pioneers born during the Phoenix-Hour of the of 1885-1900.

The ideas of the Phoenix hour were further developed by the following generations of the first phase. Alice Miller (1923-2010) paid attention to the emotional nature of the young children. Hans Eysenck (1916-1997) reflected that the largest influence parents have on their children is at the moment of conception [33, p. 83].

Each human being has particular parents born as particular people at a particular phase of history. Seen in light of the Phoenix Clock model and ECT, there is something in the atmosphere of each epoch that is shared by all the human kind of these times. Multiple events and decisions that occasionally took place in the lives of one's parents and grandparents suddenly are grasped as linked together by the thread of time and responsible for setting timelines in the lives of the future generations. I'd like to mention here just a few examples of exceptionally aware mothers of the influential Phoenix-born children whose stories serve as impressive evidences in favor of the Whole-Self theories stressing the importance of the parental attitudes to pregnancy and childbirth.

The first one deals with the biblical figure of the prophet Samuel. His mother Hannah (in Hebrew: *favor, grace*) is traditionally one of the seven prophetesses mentioned in The Hebrew Bible (*Tanackh*). In her private silent prayer, she asked God for a child and in return she vowed in her heart to dedicate him for the service of God. When she conceived and bore a son, she named him Samuel, literally *Heard by God*, since she had asked the Lord for that baby. After the birth of Samuel, Hanna expressed her joy and gratitude to the God in her Psalm of Thanksgivings, which is considered to stay one of the best examples of the most eloquent and elevated poetic songs.

The accurate birth dates of Hanna and Samuel are not available, although there is a good chance that Samuel was born during the Phoenix Hour. We also cannot be sure about the birth dates of most of the other biblical figures. Yet there is no doubt that King David and the prophet Jeremiah were born later than Samuel. Today both might be seen as messengers of the Whole-Self visions. Thus, David in his Psalm 139:13 wrote:

For you created my inmost being;
you knit me together in my mother's womb.

Jeremiah 1:5 says: "Before I formed you in the womb I knew you, and before you were born I set you apart and appointed you a prophet to the nations."

One can understand from those lines that the parents of the prophets were aware of the future roles of their children. When we proceed from the Jewish prophets to Greek philosophers, this message becomes even stronger and clearer. The well-known biographer of Pythagoras, Iamblichus (c. AD 245-c. 325), tells the story that the Pythia prophesied to Pythagoras's mother while she was pregnant with him that she would give birth to a man supremely beautiful, wise, and exceptionally beneficial to humankind.

It means that to bring up a genius, his parents should be at least to a certain extent to be prophets by themselves and to be ready to welcome an exceptional human soul. The next example is even more impressive, because it is accurately dated and described by Aelius Donatus in *Life of Virgil* [42].

Although usually history is not sure about the dates of birth of most of the influential figures of the antiquity, there is a precise date of birth of Virgil: October 15, 70 BC. As it happens to the most prominent Phoenix-born figures, Virgil's mother had a premonition about his future special role. While she was pregnant with him, she dreamed that she gave birth to a laurel branch, which struck root when it touched the earth and sprang up on the spot, so that it

looked like a full-grown tree, stuffed with diverse fruits and flowers. The dream gave her a clue that the birth would prove to be auspicious, and that the child will be a happy and a creative person. Indeed, when the child was born, he did not cry, so mild was his countenance. After his birth the parents got another prophetic sign, when a poplar shoot planted on the spot of Virgil's birth, grew so quickly to be a tree that it equaled the growth of poplars planted long before. It was called "Virgil's tree" and regarded as holy by pregnant women and young mothers who used to make their vows at it.

The next example of the Phoenix-born child is closer to our days. It is even more accurately dated, and it sheds light on the role of a prophecy during the Age of Exploration.

In the *The Phoenix Clock* I have analyzed scrupulously the life, the complex character and times of Prince Henry the Navigator – one of the great men, who have changed the course of history. It is hard to overestimate his unique role as a pioneer of Modern Exploration. Much has been said about this hero of Portugal, and his biographer John Ure wrote:

"All times are times of transitions to those who live through them. But the year 1394 – in which Prince Henry of Portugal was born – had more claim than more years to be considered as a period when the world was on the move, when new forces were replacing old ones, when new values were challenging accepted ones, when new ideas were penetrating established patterns of thought" [43, p.15].

Most of the biographical details of Prince Henry's life were recorded by his chronicler, Zurara (c. 1410-1474). Prince Henry's mother was the pious Queen Philippa of Lancaster, who had a court astrologer whom she asked to cast a horoscope of her newly born fourth son Henry. The boy was born on March 4, 1394 in the city of Porto, and later he himself was deeply versed in astronomy and mathematics. Eventually, analyzing six major reasons for Prince Henry's endeavors, Zurara explicitly stated that one of them, and perhaps the ultimate one, was to fulfill the destiny foretold in horoscope [44, p. 65]. According to Zurara's interpretation, the planets' positions in Henry's horoscope showed his predestination to "making great and noble conquests and to the uncovering of secrets previously hidden from men"[45, p. 14]. Given this knowledge. Henry's parents prepared him properly for his future mission.

In the most recent Henry's biography, Peter Russell protests the modern tendency to diminish the significance of the role of this horoscope [45, p.16]. He reminds that astrological prediction was used routinely at the Portuguese court. And we should add that not only at the court. Summing up the achievements of the early Portuguese navigators, the celebrated Portuguese mathematician, Pedro Nunes (1502-1578), made an important observation:

"Now it is evident that those discoveries of coasts, islands, and mainland were not made without nautical intelligence, but our sailors went out very well taught and provided with instruments and rules of astrology (sic.) and geometry, which, as Ptolemy says in the first book of geography, are things with which cosmographers ought to be acquitted" [44, p. 55].

An interesting detail: the Latin adverb *sic* ("thus was it written") was usually added in all the modern texts, where Nunes's words were quoted. The typical usage of this word is to inform the reader that any errors or apparent faulty reasoning in quoted material are reproduced, exactly as they appear in the original text. This is because in the last centuries the scientific audience disapprove any mentioning of astrology. As a physicist myself, I am aware of the profound differences between temporology and astrology: while the former studies the laws of time itself, the latter traditionally tries to impose its opinion on those who seeks its advice. Nevertheless, I am also aware that all the sciences and scientists are prone to unavoidable mistakes, and that this fact alone should not become a reason for avoiding certain fields of human inquiry.

Our next hero is one of the most prominent Phoenix-born composers ever, a virtuoso pianist and conductor Sergei Prokofiev (1891-1952). From his early childhood Prokofiev believed in his special mission of both a composer and a diarist. From his brilliantly written *Childhood* – the first

part of *Autobiography* – we have a first-hand information about his early years and about his exceptionally close relationship with his influential mother who was also his first tutor.

Prokofiev was born to parents who were not young and who desperately wanted a son. His mother, Maria Grigorevna Prokofieva (34) had a fine musical taste and was a serious amateur pianist. Already from his pre-natal period in the mother's womb Sergei was inspired by hearing his mother practicing up to six hours a day, playing the finest pieces of Chopin and Beethoven. Watching his interest in music, Maria became his first piano teacher as he turned three. Fortunately, she never forced Sergei to study the piano, and her respect to his special needs as a gifted child was very important for his future success.

Nevertheless, there was also a tragic, harsh and sometimes even cruel side in these mother-child ties. By the time of her pregnancy with Sergei, Maria had already borne two daughters who died in infancy. She was afraid to lose this baby too, and such fear permeated her relationships with him. Eventually the typical Phoenix Hour issues of the meanings of life, death, rebirth, transformation and cyclicity became the major themes in Prokofiev's oeuvre, including his most popular opera *The Love for Three Oranges*, the ballets *Romeo and Juliet* and *Cinderella*. Even his most frequently performed work – a symphonic fairy tale for children *Peter and the Wolf* – deals with the meaning of violence, life and death. Furthermore, in his extensive *Diaries*, published posthumously, Prokofiev does an amazing job of tracing the streak of cruelty that according to him ran through his life from his transgenerational history through his birth and to the very end.

To conclude this section, I'd like to quote Shakespeare: "*Time travels in diverse paces with diverse persons.*" We have already discussed a few mechanisms responsible for such a diversity. In the next section we shall discuss a radically different one.

4. Cartography of Emotions

From the four [Elements] Loving-Kindness was formed...

Abraham Ibn Ezra

Analysis of the vast historical data suggests that though time is real in the sense of its identification with logical algorithms existing behind the processes, yet to reflect its complexity we should construct a new scientific model [18, 21, 40]. Such time should have a two-fold complementary nature, qualitative and quantitative, able to describe chronological evolution and cyclic recurrences, internal motivations and external restrictions, colors of the constituting elements and fragrances of the individual moments.

My studies of the biographical materials eventually led me to a feeling that reinventing the historical times would be more effective if we would enrich quantitative chronological approaches with the poetic logic of the four traditional elements – Air, Water, Earth and Fire [4, 5, 40].

This section contains a short sketch summing up the results of a pioneer venture into temporological study of elements, presented in my recent book *Cartography of Emotions*. This experiment indicates something that had never been reported before: regardless of sex, age or education, people tend to define emotions in correlation with their birth date and the corresponding predominant element. These findings are consistent with the philosophy of antiquity concerning the four primordial elements.

The initial aim of the survey "Cartography of Emotions" was to explore the temporological and measurable aspects of *emotions / feelings* (for most people today emotions are not distinct from feelings). According to the emotion scientists, "emotions are events that develop over time" [46, p.103]. Time and emotions are linked in many ways. The first aspect of this connection is associated with the duration of the emotional experiences. Although the term emotion is not clearly defined, usually it describes only momentary reactions, and not the stable

feelings or moods. According to Paul Eckman, the duration of an emotion is limited to seconds, while in other studies they occur over a relatively long duration such as days, months or even years [47, p. 40].

The second aspect of this connection between time and emotions deals with the historical changes of the emotions among people of different generations from different historical epochs [48]. Some researchers feel that emotions, like the seasons, are cyclical [49]. When we turn to the elements and remind ourselves that the sequence of their manifestation is similar to the alternation of the seasons, it is logical to assume that people born during the periods of predominance of different elements may be more susceptible to the typical features of these elements. A possibility of such correlation between the temporal aspects of the elements and the features (or emotions) of people is described in Jung's theories [9].

While there are no agreed definitions of emotions or feelings, and no clear definition even of one type of emotions exists, an interesting approach is taken by Aaron Ben Ze'ev. In his monograph about emotions he speaks about four basic components of emotions, namely motivation, evaluation, cognition and feeling. Stressing that each component itself cannot be seen as an emotion, because "emotions do not entail the separate performance of four varieties of activity: knowing, evaluating, desiring, and feeling" [47, pp. 48-50]. It implies that an emotion should be seen as an emergent property of the whole system, and as such it is more sophisticated than the sum of its components.

All the complexity of emotions could receive a new interpretation, if we would apply the philosophy of the four elements to it. Traditionally, Fire is the prime element of volition and desire; Earth is the prime pragmatic element, associated with matter; Air is the prime mental element, associated with human thoughts; Water is the most sensitive element, associated with human feelings or emotions. In these terms, Ben Ze'ev's four basic components of emotions (desiring, evaluating, knowing and feeling) can be easily associated with Fire, Earth, Air and Water, respectively.

The present study was preceded by a chain of "fortuitous" events in my life. In 2015, the founder of the Institute for Time Nature Explorations, Prof. Levich, invited me to present my time-studies at the Moscow State University. Then the invitation came to participate in the TV show "What is Time?" where I met a philosopher, Prof. Molchanov. Subsequently, I was fascinated by his meticulous monograph on the history of the time studies [50]. What struck me most was the great variance of the numerous and conflicting time-definitions collected in it. It was as different philosophers were referring to different notions when they were speaking about "time." An analysis of the birthdates of the mentioned philosophers revealed an even more striking fact: cardinal differences in their time-definitions matched the traditional differences between the elements corresponding to the birth dates of the philosophers themselves [51]. To be more specific, Fire tends to prefer energy, motivation or volition; Earth – material objects, stimuli or behavior; Air – logic, words or abstract ideas; Water – feelings, beliefs or moral values.

A sequence of further studies of poetic metaphors, which are characteristic to the well-known poets, scientists, philosophers and even musicians, revealed a similar trend suggesting that for each creative person there is one major element, be it Air, Fire, Water or Earth, with which he/she most strongly resonates. It turns out that such a subconscious preference might not be a random choice, but a reflection of the elemental belonging of the Sign associated with one's birth (traditionally, the Elements are related to the Zodiacal Signs as follows: Fire is associated with Aries, Leo and Sagittarius; Earth – with Taurus, Virgo and Capricorn; Air – with Gemini, Libra and Aquarius; Water – with Cancer, Scorpio and Pisces) [5, 6, 40, 51]. The following typical examples of the prominent emotional theorists vividly illustrate this idea.

Fire

René Descartes (1596-1650) is often regarded as the first Western philosopher who studied emotions. Born in a Fire Sign (Aries), he called emotions as **passions** or **desires**. He believed that

all passions were caused by certain small "spirits" which were "moving very fast, like **flames** shooting out from a **bonfire**." The primary aim of each passion was to arouse our body to wish for certain actions:

"Thus, the feeling of fear moves the soul **to will** to flee, that of courage **to will** to fight, and similarly with the others" [52, part 1, p. 40].

For him, even thoughts, actions and perception were identified as "**volitions**."

As a rule, Fire-predominated researchers, such as Baruch Spinoza (Sagittarius) or Stanley Schachter (Aries), place a greater emphasis on the role of non-rational motivation or drive as the primary cause of emotions.

Earth

One of the most important Earth-predominated theorists of emotions was William James (Capricorn). He had a pioneering role in the study of psychology and achieved international fame as a philosopher with his doctrine of pragmatism. James placed the **somatic** component prior to the feeling component, claiming that **bodily responses** precede emotional experience ("we feel afraid because we run/ tremble") [53]. He went as far as to declare that "if we fancy some strong emotion and then try to abstract from our consciousness of it all the feelings of its bodily symptoms, we find we have nothing left behind" [53].

Subsequently, these ideas have formed the basis of the philosophical and psychological teachings of behaviorism, the founders of which are American psychologists John B. Watson (Capricorn) and Edward Lee Thorndike (Virgo).

Air

In sharp contrast, the Air-predominated type tends to diminish the value of the physical or physiological level and to overestimate the role of the mental one. To quote Blaise Pascal (Gemini): "I can well conceive a man without hands, feet, head. But I cannot conceive man without **thought**; he would be a stone or a brute" [54].

In 1927 Walter Bradford Cannon (Libra) refuted James' assumption that each emotion has a unique response pattern. He showed that there is no one-to-one correspondence between bodily changes and corresponding emotions (e.g., both anger and fear come with increased heart rates) [55, p. 11].

As a rule, for Air-predominated researchers, emotions are not distinct from cognition, and it is important for them to link an emotion with a mental image, thought or symbol. Such Air-predominated researchers as Carroll Ellis Izard (Libra) or Silvan Tomkins (Gemini) tended to identify emotions with **mental** categories, certain philosophies of mind and cultural worldview. They suggested that such bond constitutes "an affective-cognitive" structure. [56, p. 14]. Izard even supposed that the main function of joy or fear is just to provide a relief, a period of rest from the vigorous activity motivated by **interest** [56, p. 124].

Water

In contrast to Air-researchers, the founder of cultural-historical psychology Lev Vygotsky (Scorpio, 1896-1934) was denying any emotional value of the words or thoughts. He went as far as to exclaim: "But what are words? They are just an empty sound!" [57]. Instead, he argued that emotions should be primarily identified with the highest **moral values**.

In general, the Water-predominated researchers are seeking to discover human feelings underlying all our existence and are deeply involved with the sea of joys and sorrows. They would also easily agree with Gaston Bachelard's (Cancer) credo: "We integrate the rules of **morality** with the laws of psychology" [10, p. 101]. In 1890, the French scholar Lucien Febvre (Cancer) challenged historians by his appeal to reconstitute the moral universe of each preceding generation. He believed that "a mere collector of supposed facts is as useful as a collector of matchboxes." In order to understand the life during a certain period, it was necessary for him to live like the people of that period, **suffering** and sharing their **joys** with them.

All these observations imply certain links between metaphors and feelings. Although, hypothetically speaking, we can feel emotions even when we cannot name them, to transmit our concept of emotion to others or to perceive each other's' emotions, we need words [46, p.105]. Consequently, at present, the best way to detect emotions is to ask people to describe them in their own words [46, p. 107].

The Nobel Laureate in Medicine G. M. Edelman (Cancer, Water) wrote: "brains operate *prima facie* not by logic but rather by pattern recognition. This process is not precise, as is logic and mathematics. Instead, it trades off specificity and precision, if necessary, to increase its range. It is likely, for example, that early human thought proceeded by metaphor, which, even with the late acquisition of precise means such as logic and mathematical thought, continues to be a major source of imagination and creativity in adult life" [58, p. 58].

A similar metaphorical capacity was vividly described by the French philosopher Gaston Bachelard (Cancer, Water) whose pioneering works on elements forged a new direction in the field of phenomenological studies of the imagination. Inspired by traditional philosophies and ancient cosmologies alike, Bachelard believed in the possibility to "establish in the realm of the imagination, a law of the four elements which classifies various kinds of material imagination by their connections with fire, air, or earth" [10, p. 3].

Bachelard also suggested a possibility of classifying poets by their response to the question: "Tell me which infinity attracts you, and I will know the meaning of your world. Is it infinity of the sea, of the sky, or the depth of the earth, or the one found in the pyre?" [59, p. 5]. In a similar way, *Cartography of Emotions* supposes that the use of specific metaphors in response to the question **"What are your five most important emotions / feelings?"** can shed light on the interconnections between our emotional nature and our predominant innate element. Testing a hypothesis that feelings, like poetical images, are dependent on the four basic elements, this study inquired: **"Can we speak of the distinct emotional features of people with strong affinities to each of the four elements?"**

In this short paper, which is a mere outline of the subject, I can mention only a very small portion of findings that have been discussed in *Cartography of Emotions* [4]. In the course of this experimental survey that ran for approximately two years, a total of 1419 participants from 14 countries, aged from 14 to 90 years, filled the same questionnaires, formulated in three principal languages of the survey (Hebrew, Russian, English). In addition to naming their 5 most important emotions, participants were asked to write down their birth date. This data allowed assigning each participant to the corresponding predominant element. All the participants took part in the experiment on a voluntary basis. These were free questionnaires; the participants could fill blank anonymously and name emotions / feelings in their native languages. All and all, there were 753 filled blanks in Hebrew, 603 in Russian, and the rest in English, Bulgarian, German, French and Italian.

At first, all the filled blanks were divided into four groups, according to the elemental belonging of participants' birth dates. Table 1 shows the results.

Element	Fire	Earth	Air	Water
Number Participants	357	327	360	375

Table 1. Number of participants according to the elemental belonging of their BP

It turns out that the Water-born group has shown greater readiness to participate in this experiment than the Earth-group. This difference (14.6%) is consistent with the traditional view of the Earth element as the less emotional one. This qualitative result is impressive *per se*, and it can outline issues for further research.

On average, participants named 5 important emotions with a minimum of zero and a maximum of 13 answers.

By their styling, all the answers could be immediately divided into three types.

The first type of answers reflected the state of confusion among those participants who rarely analyzed or verbalized their feelings. About 0.6% of all the participants were ready to state explicitly that they had never experienced any emotions at all and had no idea what they were. This result is consistent with the studies of *alexithymia*. This term was coined in 1973 by a psychiatrist Peter Sifneos; it comes from the Greek roots a (lack), lexis (word) and thymos (emotion) and literally means "without words for emotions." Individuals with alexithymia have trouble in describing emotions as well as differentiating between emotions and bodily sensations. Sometimes alexithymia is regarded as an aspect of personality.

The second type of answers described personal specific experiences which could not be reduced to a single term and instead were expressed in long sentences. About 13% of all the answers belonged to this type.

The third type described emotions that participants could name in a **single word**. To describe their emotions the participants used 389 single words in Russian, 315 single words in Hebrew and 110 words in English.

According to Lisa Feldman Barrett, those feelings, which have generally recognized names, reflect the current cultural collective attitude to emotions [46], and as such they are of the greatest value for the present research. It is proposed in the present study to list an emotion as a basic one in case it is described as a single-word answer and in addition satisfies the following requirements:

- In all the languages of the survey this emotion could be described by a single word, indicating that it was deeply rooted in the collective universal experience of people speaking various native tongues.
- This emotion was listed at least by one participant in each of the three principle languages of this survey (Hebrew, Russian and English).
- In order to name an emotion as a basic one, it should be listed by a significant number of participants. In the current survey that minimal number was chosen as 5% of all the participants, which made at least 70 people.

Table 2 shows seven basic emotions that met all these requirements:

Love	Joy	Happiness	Anger	Sadness	Fear	Calmness
63.2%	44.9%	15.3%	12.7%	11.9%	9.5%	8.8%

Table 2. List of Basic Emotions

Perhaps the most meaningful fact about this list is that, unlike most of the previously proposed lists, the words **love**, **joy** and **happiness** appear at the first places. For comparison, it should be added that whereas the emotion of **interest** was regarded by Izard (Libra, Air) and Tomkins (Gemini, Air) as one of "the most frequently experienced positive emotions" [56, p. 91], it was listed by 2% of the participants and therefore could not be included in the present list.

It should be especially emphasized that unlike the basic emotions proposed by Aristotle, Descartes, James or Ekman and chosen by them either arbitrarily or based on their personal experience, this list is obtained by a large-scale survey, and therefore reflects the inner world of a contemporary multinational and multilingual group of all ages.

In addition to these more popular emotions and feelings, the participants named such different aspects of human experiences as thoughts and inclinations, needs and interests, impulses and feelings, drives and behavior, all that including numerous nuances in different languages. To overcome the language barriers as well as to ignore multiple nuances of different emotions it was decided to combine similar experiences into larger groups or categories.

For example, in Russian there is no exact verb for "to like," and in many cases it is translated as "to love." Whereas in case of basic emotions, the noun "Love" refers to a specific feeling both in Russian and in English, the English verb "like" has much wider spectrum of translations

into Russian. In the process of categorization all this spectrum of multiple "loves" and "likes" was united in a single **Love** category.

After collecting all the answers, the next step was clustering the emotions into larger categories. In the end, **26 categories** of emotions were formed, namely (in alphabetical order): Aesthetics, Anger, Behavior and Character Traits, Belief, Calmness, Compassion, Coloring, Creativity, Confidence, Courage, Desire, Devotion, Disgust, Fear, Gratitude, Happiness, Intellect, Joy, Love, Morality, Relationships, Sadness, Physical sensations, Sociability, Stimuli, Wonder.

Those few answers that did not fit in either of these categories were grouped into the 27th category, called Miscellaneous.

At this point many people are surprised and tend even to protest against including some of the categories as "emotions" or "feelings". Yet this is the very essence of this research – to listen to people and to **respect their own** world-view. Therefore, it is very important to stress that **the main assumption of this survey is that if any participant decides that "X" is an emotion, then this "X" allows to that person to perform an emotional function, and therefore by definition of the study is accepted as an "emotion."**

The next steps performed qualitative and quantitative analysis of the data, which included the one-way ANOVA and Pearson's chi-squared tests. The results were consistent with our preliminary qualitative estimates: at least five categories – **Intellect, Desire, Fear, Courage and Stimuli** – revealed a significant violation of the null hypothesis that all the groups were similar in their emotional preferences. In other words, there are strong indications that people born in different elements are distinguishable by their attitude to feelings and emotions.

From a qualitative point of view, it is most important to stress that the revealed differences between four groups are consistent with the classical contrasts between the corresponding elements. The following four paragraphs outline briefly the most striking features of each group.

Fire-Predominated Emotional Type

Like the Fire theorists, Fire-born participants tended most than others to identify emotions with **desires, intentions, motivations and energetic resources** to fulfill certain wishes and plans. For them the primary function of emotions is to direct their actions, thoughts, etc. Among their preferable emotions were

- Energy of life;
- Desire;
- Permanent lack of time. Impossibility to carry out the conceived.

Earth-Predominated Emotional Type

Like William James, Earth-predominated people are quick to identify an emotion with any stimuli or object of their interest. For them it is not rare to call an emotion "a book" or "work," and not the feelings experienced by them while reading or working.

They also tend to define emotions as physical senses. The problem is that such responses as "smile," "laughing" or "crying" are not unequivocally connected with any specific emotion. A smile on one's face can be associated with such different emotions as joy or bitterness, embarrassment or triumph. One may cry from happiness, while someone else will laugh from despair .

Among their answers were :

- I do not know. No answer
- Good work or good people
- Employment
- It all depends on the situation
- I like to cook for those whom I love.

Air-Predominated Emotional Type

For Air it is crucially important to create meaning and to find its adequate verbal expression. On the one hand, prevailing answers in the Air-born group are dealing with understanding, learning, and Intellect. On the other hand, their tendency to predict all the possibilities, including the worst outcomes, increases their Fear.

A few typical answers :

- Thinking and thoughtfulness
- Understanding of joy, sympathy, fear, obscurity
- Self-knowledge
- Integrity as mental perfectionism
- Fear and horror.

Water-Predominated Emotional Type

Water is focused on feelings, which assure whether certain actions, wishes and plans are in accordance with the personal and collective course of evolution. For them emotions function to praise or disapprove the results of their dreams and actions. Significantly, the Water group was the most active one in the categories of **Belief** and **Morality**. Nevertheless, the small number of participants who choose these categories left this observation statistically inconclusive.

A few typical answers:

- Revelation and love for wisdom
- The joy of light, appearing almost always
- Belief
- Love thy neighbor as thyself
- Co-joyfulness.

Today most people might not be conscious of the differences of our primary emotions. As a result, what seems obvious to the adherents of one element looks unnatural for the adherents of all the other elements. Nevertheless, individual emotional expressiveness and sensitivity is a crucial factor in marriages and parenthood, in friendships and partnerships. Innumerable problems and conflicts arise when people take it for granted that other people should share their emotional needs or have the same definitions of emotions.

A typical example is that an Air-predominant person may judge speechless actions, which are perceived as true emotions by his/her Earth-predominant parent, child or friend, as an insensible and insulting behavior.

To avoid painful frustrations and quarrelling, differences in the innate emotional nature should be understood and respected. The four-element philosophy sees an instance of emotion as a hierarchic structure, in which sensational, mental, volitional and feeling components do not occur as discrete events, like beads on a string, but as a continuous multilevel process corresponding to the whole-self system.

To understand a practical side of this four-element approach, it is helpful to turn again to the biographical case of Sergei Prokofiev. Born in Taurus (Earth), he valued mostly earthly images and things. Symbolically, critics and biographers felt his earthy-predominance in his music. For example, the pianist Heinrich Neuhaus in his article "Prokofiev, Composer and Pianist" wrote: "His music is earthy in the best and most human sense of the word."

Furthermore, Prokofiev's extensive diaries and letters provide first-hand information about his daily associates, and what impact each of them had on him. Analyzing his personal and professional relationships it was possible to divide them into four groups, which match well the four elements [6, 7].

Earth

The most important people in Prokofiev's formative years belonged to the element of Earth. For instance, his mother Maria (Capricorn) and his first governess Louise Roblin (Virgo); his first tutors Pomeranzev (Virgo) and Glier (Capricorn); his most influential professors – Lyadov (Taurus), Chernov (Taurus) and Tcherepnin (Taurus). Moreover, his most significant and life-

long friend Myaskovsky (Taurus), his first fiancé Nina (Capricorn) and his second wife Mira (Capricorn) were also Earth-born.

Fire

A very different kind of relationships was typical with Prokofiev's Fire-born acquaintances, each of whom became a source of his professional aspirations and motivations. The prominent composer and director of the Moscow Conservatory, Sergei Taneyev (Sagittarius), played an inspirational and visionary role in Prokofiev's musical development as a composer. In his autobiography, *Childhood*, Prokofiev wrote that his first visits to Taneyev became the focal events in his life. Due to Taneyev's initiative, Prokofiev began to take his first private lessons in composition. Later, when Prokofiev turned 13, he met the well-known composer and director of the Saint Petersburg Conservatory, Alexander Glazunov (Leo) who convinced the boy's parents to send their son to the conservatory. After graduating the conservatory, Prokofiev met the legendary impresario and the founder of the *Ballets Russes* (Russian Ballet), Sergei Diaghilev (Aries), who saw the promotion of Russian art in Europe as his mission in life. Diaghilev's role in Prokofiev's promotion is hard to overestimate. Serge Koussevitzky (Leo), Russian-born American conductor, publisher and a music director of the Boston Symphony Orchestra, was a champion of Prokofiev's modern music. He published and presented to the public many new works by Prokofiev.

Air

In sharp contrast with the two previous groups, Prokofiev's relationships with his Air-born friends, such as the famous film director, Sergei Eisenstein (Aquarius); one of the most important composers of the 20th century, Igor Stravinsky (Gemini), or the legendary Soviet violinist, David Oistrakh (Libra), were mostly on the intellectual level. The same was true about his first wife Lina (Libra), who was highly appreciated for her intellectual skills.

Water

According to Prokofiev's first wife, Lina, sentiments in Prokofiev's relationships as in music were "anathema." Prokofiev's "lack of basic human feeling could be shocking, as was the strange comfort he found in transferring matters of the heart to the mind" [60, p. 34]. As an example of his insensitivity, Lina quoted Prokofiev's chilling entry from his 1910 diary, written soon after his father's – Sergei Alexeyevich Prokofiev (Cancer) – untimely death: "Did I love him? I do not know ... He served me, his only son, unstintingly, and it was thanks to his tireless work that I was provided for so long with all my material success" [60, p. 34].

The early roots of Prokofiev's emotional rigidity could be traced to his early babyhood. As it was already mentioned, Sergei was his parents' only surviving child, and the tragedy of losing both of his older sisters was a part of Prokofiev's prenatal history. That loss has deeply affected his parents' emotional nature and made his father's natural warmth become frozen. Later all Prokofiev's relationships with Water-born acquaintances were colored with irrational feelings. He was either passionately attracted to them, like to the chess player, Jose Raul Capablanca (Scorpio), or unreasonably disliked them, like the violinist, Lazar Saminsky (Scorpio). Since Prokofiev usually tried to avoid emotional situations, there were fewer Water-born people in his vicinity than Earth-born friends. Some Water-dominated people, like the renown pianist Sviatoslav Richter (Pisces) maintained that Prokofiev was too dry, that there is nothing sentimental in his music.

The further detailed analysis of Prokofiev's close circles demonstrates that sometimes predominant emotions of one group of people seem to be at odds with those of the others. Yet we cannot say that one group is right, and the other groups are objectively wrong. The point is that they have subconsciously imbedded different meanings into their definitions of emotions. If so, then the future science of emotions should ask itself how unconscious preferences affect the very basis of empirical and scientific knowledge and how we should integrate physical, mental, volition and feeling levels of perception. We should ask ourselves, can we

simultaneously welcome the material abundance (Earth), the logos and the rational mind (Air), the burning desire (Fire) and the feeling soul (Water)?

What makes me optimistic about this question is an example of the group dynamics described in one of the most popular historical novels of all times – *The Three Musketeers*. Although the title mentions three musketeers, in the novel itself their success as a group is guaranteed by the coordinated cooperation of the **four** friends, each of whom is representing a different temperament and different element: d'Artagnan (Fire), Porthos (Earth), Athos (Air) and Aramis (Water). This archetypal example suggests that to harmonize our relationships and our self-respect we need to understand, accept and respect all the complementary emotional features of the four elements. My belief is that in the long run, a deeper understanding of the four-element approach will enable us to perceive ourselves and others in a new and more complicated and evolved light.

In conclusion, I'd like to stress that unlike the Dumas' fictional narrative, the present inquiry has empirical character, and its findings are crossing the history of our culture, including arts, sciences, music and social orders.

That brings us to the next section, where all the temporal theories from this paper will be illustrated by a unique single case of the Phoenix-born composer Sergei Prokofiev (1891-1952). Analyzing his *Diaries*, we shall show that the proposed model of a complex hierarchic time enables us to reflect both qualitatively and quantitatively on the complexity of a human's life-path and the periodization of its stages.

5. Opera PRKFV:

A Biographical Case Study of the Composer S.S. Prokofiev

Prokofiev works like a clock.

Sergei Eisenstein

*The months and the days are the travelers of a hundred ages;
the years that come and go are also voyagers.*

Li Bai (701-762), (tr. Donald Keene)

At the beginning I'd like to point out that the following text is a brief synopsis of selected chapters from my latest book *Opera PRKFV* dedicated to the temporological case-study of Sergei Prokofiev [6].

Nowadays it is accepted that there is no calendar or reference clock for planning human lives, because analyzing personal information involves many distinct processes, and there is no conceivable way to harmonize various temporal rhythms, scales and dimensions coordinating all of them. Yet, in the previous sections it was suggested that even though we cannot predict the details, we might discover the universal laws governing the overall dynamics of such highly organized systems as human beings, cultures and societies. This section will show that Prokofiev's personal diaries can illustrate both the complexity of human life and a possibility to discover an interrelated set of natural rhythms reflecting it.

The 13th century scholar, Rabi Avishai of Bulgaria, once told an amazing story about his opportunity of seeing the rare manuscript *The Power of the Human's Years* written by Abraham Ibn Ezra at the age of 75. Rabi Avishai believed that the messages in this manuscript permitted us to decipher the universal laws of time and to learn how to correspond the timings of one's actions with the positions of heavenly bodies serving as reference clocks [61].

Unfortunately, this manuscript is missing, and historians doubt the very fact of its existence. Yet there exists a true story of one of the most prominent composers ever, Sergei Prokofiev, whose diaries depict his deeds and thoughts day-by-day, week-by-week throughout more than two decades of his adulthood [62]. Also being an accomplished writer, Prokofiev meticulously

recorded and chronologically organized all his experiences in his diaries, which provide a valuable tool for measuring both his personal growth and historical changes during his lifespan. Born during the Phoenix Hour of 1885-1900, Prokofiev believed from his childhood in his special mission both as a composer and a diarist. Indeed, he became one of the most observant diarists of his intense historical period. Reading his diaries, we feel how the encounter with the new Phoenix Hour had immeasurably altered the lives of his whole generation who witnessed the profound changes all over the Earth [63]. Today Prokofiev's 2,250-page diaries, published in 2002, are accessible to empirical study and provide a striking personal account of life in the previous century.

The readers of *Diaries* meet Prokofiev first as a child and then as the youngest student in the St. Petersburg Conservatory. Then they follow his life in the USA, in Europe and in his first return to the USSR. The *Diaries* also tell about the contemporary musical life, Prokofiev's personal finances, his family relationships, his household and major political and social developments. Prokofiev was not too embarrassed to tell the diary about his love stories, affections and separations. Although initially those diaries were written for personal use only, Prokofiev was sure that one day they will be published, and therefore he often reread and edited his earlier entries. Because of their rich vocabulary and high literary quality, they are even considered as a work of literature [64].

Nevertheless, a question arises: why Prokofiev? Why are his diaries so exceptional? After all, keeping diaries and journals became popular from the 19th century, and lately diaries have even become an academic subject of historical studies [65]. The answer lies in his discipline and unique personal style of writing. Most diarists only rarely express freely in diaries what happened within them and around them out of consideration for themselves and many others. Even in Japan, known for its thousand-year old tradition of keeping diaries, most of such literature was not written on a day-to-day basis and in fact should not be called "diaries" at all. Most of the diarists wrote their memorable reminiscences, which they called "diaries" only under special short-living circumstances, such as their travels or summer vacations [66]. In addition, many diarists report about their intentions to burn all of their personal notes before the death. Some of them, like Prokofiev's closest friend – the Soviet composer Myaskovsky – finally did it. In a sharp contrast, Prokofiev found it very important to preserve from oblivion almost all the experiences of his first half of life. From his very childhood he became aware of his exceptional role: keeping the diaries became as important to him as composing music. He believed that his private diaries would long outlive him, no less than his music and operas.

In addition, there are several other reasons for my choice of Prokofiev's diaries.

- Firstly, Prokofiev is seen as a symbolic figure of his turbulent epoch, and it is said that "the future generations will not be able to understand that difficult and glorious time, which we still have the right to call our own, without <...> pondering over his remarkable life" [64].

- Prokofiev led an extremely rich, eventful and creative life. Born in Russia, he traveled and toured extensively throughout the world. He was acquainted with many well-known people, and his chronological data can be verified by crosschecking with multiple reliable sources.

- Born in Taurus (Earth), Prokofiev, unlike many artistic diarists, considered himself as a practical realist and was known for his laconic exactness. His entries are easier to analyze because of their descriptive and impartial character. Even emotions are "objectivized" and pinpointed "as events in his life" [64].

- Many people keep diaries during short periods of time and most authors neglect their diaries toward the end of their lives. Such periods are not long enough to discover the cyclic components of their life experiences. The especial attraction of Prokofiev's diaries is that they were kept regularly and for a long period of time.

- Analyzed together with his *Autobiography* and numerous letters and the diaries kept by his second wife Mira Mendelson (1915-1968), the *Diaries* enable us to reconstruct a detailed

chronological mapping of Prokofiev's entire personal and creative life. Unfortunately, from the literary point of view, there is a sharp contrast between Prokofiev's own diaries before his final return to the USSR and the later diaries composed by Mira Mendelson [67]. Her entries are irregular and most of them contain boring details of daily life. They rarely provide fresh insights or glimpses into the characters of Prokofiev's friends and times. In her diaries she remained extremely cautious as she could never report sincerely about political dramas and personal tragedies during Stalin's purges. Nevertheless, from the chronological point of view, Mira's diaries, at least partially, provide the same strict structure of days, months and years as Prokofiev's. The results are indeed amazing as they provide invaluable data for uncovering various rhythms governing Prokofiev's creativity.

- Prokofiev's additional autobiographical materials provide important information not only about his childhood years, but also about the transgenerational habits in his family as well as about pre-natal and perinatal traumatic experiences. Keeping an extensive and regular diary for a long period of time led to the meaningful insights into the cyclic nature of various processes in our lives in general. The observation of a certain periodicity in his hectic activities and complete withdrawal from creativity became a constant motif throughout Prokofiev's diaries. These entries in his diaries are arranged by year, month and day, and such strict structure enables to establish meaningful connections between seemingly different events constituting in fact the different stages of the same processes. **Due to such continuity, one of the main heroes of all of Prokofiev's biographical materials becomes the cyclic passage of time itself.**

- Comparison between Prokofiev's diaries and autobiographies elucidates the main differences between these genres. For instance, the order in which certain events appear in autobiographies is often chosen by artistic and not chronological considerations. It is not so in diaries, when each event is bound by a specific day. The diarist cannot yet know what will happen tomorrow, and therefore diaries are written as a series of unrelated episodes. On the contrary, in the biographies each event becomes an integral part of a certain narrative, and it can even be blurred up in the light of future developments. As a rule, biographers use coarser scales for their life-mapping than diarists; therefore, diaries can disclose certain shorter cycles, missed by biographers.

After mentioning all these reasons, I'd like to say a few words about Prokofiev's place in the history of music. One of his own major achievements as well as the achievements of his Phoenix-born generation of composers was the birth of the cinema music [68]. Prokofiev, like the two "fathers of music for films" – the **celestial twins** Irving Berlin (1888-1989) and Max Steiner (1888-1971), was born during the Phoenix Hour of 1885-1900. Due to these composers, music became the soul of cinema, and thanks to cinema, large-scale orchestral music finally reached listeners in the world's most remote corners. Furthermore, due to Prokofiev's "groundbreaking collaboration" with the film director Sergei Eisenstein (1898-1948) and due to his original score for "Alexander Nevsky," film music has become an advanced form of opera and ballet [69]. Eisenstein thought that Prokofiev's innovativeness made him "kin to the masters of early Renaissance" [64]. Strikingly, Eisenstein felt it necessary to compare Prokofiev's passionate search with that experienced by the previous Phoenix-born generation, half a millennium earlier.

Speaking about different phases of the Phoenix Years, we may illustrate the differences between them by comparing Prokofiev with another famous composer, Igor Stravinsky (1882-1971). Although Stravinsky was just nine years older than Prokofiev, these composers were not, strictly speaking, contemporaries, because Stravinsky belonged to the last phase of the previous Phoenix Year. In his diaries Prokofiev often mentioned their profound differences. Significantly, Stravinsky had not composed any film music, and listening to the new rhythms, he still could not imagine "how massive the forces of change were going to be" [69].

Continuing further analysis of Prokofiev's Birth Point and Birth Potential, it should be reminded that while the Phoenix Clock scale is comparable with the generational traits, it is too coarse for personal lives measurements.

Naturally, Prokofiev's chronological and biological aging began right from the moment of his birth (BP), which is correlated with the corresponding Sun position on the ecliptic. Qualitatively, during his entire life, each time when the Sun crossed his BP, Prokofiev (like many other people) had a very "special day" when he celebrated his birthday. Quantitatively, each time when the Sun crossed the BP, Prokofiev grew older by a "solar year." This numerical solar age played a very important role in his life: it defined such crucial decisions as when he should be sent to a gymnasium, drafted into the army or sent to retirement.

By the same token, we can examine additional planetary cycles, where all the clock readings are defined as angles made by the current positions of the corresponding planets and the BP, and the same starting point BP is chosen for all the clock readings.

Pluto and Neptune are moving slowly, and they have never crossed the BP during Prokofiev's life. Mercury and Venus are moving almost as fast as the Sun, and the differentiation between their cycles and the solar cycles remains inconclusive. It leaves us with four planetary cycles (Uranus, Saturn, Jupiter and Mars) to be considered.

Limitations of space allow just a few words about each of these four planetary cycles.

Uranus

Being the slowest planet of all the four, Uranus crossed the BP only once in Prokofiev's life, during 1935-1937. This beginning of a new "Uranus year" divided the composer's life into two sharply different halves: the first one, when he lived as a free path-seeker and the second one, when he was a Soviet citizen in the USSR.

Saturn

Saturn crossed BP during 1910-1911 and 1939-1941: once during each Uranus year. Both new "Saturn years" were manifested by painful losses, by necessity to determine a new direction in life and by fears of the future. Nevertheless, belonging to different Uranus years, each of these periods was described by different Time-Codons and was colored differently. Like Babushka dolls, where each successive doll is encapsulated in the doll larger than it, the shorter Saturn years and the longer Uranus years formed sort of a "nested hierarchy."

Jupiter's crossings of BP divide Prokofiev's life into five distinct "Jupiter years," which are exactly fitting the periodicity traditionally mentioned by Prokofiev himself as well as by his biographers. Those periods are as if coined in the usual Prokofiev's signature – PRKFV. In a way, those consonants with which Prokofiev signed his name, might also symbolize each of five distinct stages in the composer's creativity.

P= Premonition.

The first **Jupiter** year (1892-1904) was associated with his childhood in a small village. In the very beginning of his first Jupiter year, Prokofiev began to talk. At the early age of just nine he was already composing his first opera in three acts, *The Giant*. The libretto was written by Sergei himself. The opera was staged in 1899 at the estate of his aunt, Tatiyana, and the leading roles were performed by the composer and his cousins. All the family applauded the young performers. The composer's uncle said: "When your operas are performed on the Imperial stage, remember that your first opera was staged in my house."

It is amazing that Prokofiev's first opera and libretto already dealt with the problems of life and death. It was as if he had an early premonition that his cousins and his future first wife would become the victims of Stalin's terror, while he would not be able to protect them or help them.

R = Rainbow Hopes

In the very beginning of the **second Jupiter year** (1904-1916) Prokofiev left his birthplace and moved to St. Petersburg, where he entered the Conservatoire.

This was the time of his fascination with the big city, of his professional education and his first successes as a composer. At that period, he worked with a professional librettist on his opera "Undina." There is something symbolic in the choice of this archetypal narrative. The name of the opera is taken from the ancient mythological stories and was popular in the Middle ages. It was also explained by Paracelsus who believed that each of the four elements – Earth, Water, Air and Fire – is inhabited by different categories of elemental spirits: gnomes, undines, sylphs and salamanders respectively. Undines, specifically, were associated with Water and seen as dangerous creatures seducing young boys by their beautiful voices and enchanting music.

K = Key developments

His **third Jupiter year** (1917-1928) matches Prokofiev's leaving Russia for the USA and the following period of wanderings abroad. During this period in the West he was a gambler of life and he completed his 12-years of work on his opera "Gambler."

F = Fatal Finale of his life in the West

During his **fourth Jupiter year** (1928-1940) Prokofiev was in a transitional period before his final move to Moscow. His ballet "The Prodigal Son" written during this period symbolized his decision to ask for forgiveness and to return to his native land.

V= Verdict: Victory or Victim?

In the beginning of his **fifth Jupiter year** (1941-1953), Prokofiev, together with his second wife Mira, was evacuated from Moscow, leaving his first wife Lina and their two sons behind. During all this period he worked on his monumental unfinished opera "War and Peace". After the war, Prokofiev spent the rest of his days trying to adjust himself to the Soviet realities. It was a paradoxical period of his life. On the one hand, Prokofiev was counted as the foremost composer of the USSR, while, on the other hand, some of his major works (including "War and Peace") were banned from public performances. On the one hand, he was awarded the greatest number of the State Stalin Prizes. On the other hand, Prokofiev's last years were spent in ill health, moral depression and financial constraints. Those also were the years when his first wife was arrested for "espionage" and sentenced to 20 years in Gulag.

Mars

The next reference clock in Prokofiev's life is related to Mars. Mars crossed BP 32 times. Except for Prokofiev's babyhood and a few times when the data is missing, during each "Mars year" Prokofiev experienced recurring patterns of fluctuations in his level of activities. Contradicting the common belief that Prokofiev's fabulous diligence implied continuous hard work, his diaries reveal that each time when angles between the position of Mars and BP were about 0°, 90° or 180°, his activities were hectic: his work was fervent, but the results were mostly ambiguous.

On the contrary, when such angles were 60° or 120°, his activities were harmonious, and their success was unhampered. During the intermissions between these angles Prokofiev often could not force himself to initiate anything. As the years passed, he learned to make breaks and then to come "back to work again and again" [64].

It was believed that the secret of Prokofiev's success was that "he felt the heartbeat of Time" [64]. From Prokofiev's diaries we learn that his "Time" was not evenly flowing, and that its topography was not homogeneous. His "Time" was coordinated not with an arbitrary one-dimensional time-axis, but rather with the complex hierarchic system of various planetary cycles. In the first section of this paper, such set of various reference clocks was described as "Time Codons" (TC).

The analysis of Prokofiev's diaries strongly indicates that when a set of reference clocks is chosen correctly, the TC model can reveal hidden order in seemingly incommensurable historical data. Now we can emphasize that to become an effective tool for the biographical studies, such TC should reflect natural laws of stable processes, observable over a suitably large

scale. Notably, the stability of the planetary trajectories and their observability make planetary cycles promising candidates for such role.

Conclusions

Teach us to number our days
(Psalm 90)

It is already a tradition that I conclude my lectures with the famous line of the Phoenix-born poet, the Nobel Laureate T. S. Eliot: "*In my end is my beginning.*"

A few millennia prior to Eliot, another allegedly Phoenix-born figure, the biblical patriarch Abraham wrote in his *Book of Creation (Sefer Yetzira)*: "...their end embedded in their beginning and their beginning in their end like a flame bound to a burning ember..."

For me this short sketch is coming to its end, but I hope that for the readers it will turn a beginning of new inquiries in temporology.

To end of this paper I'd like to express my hope as a mother, as a wife and as a scientist, that people will gradually learn how to be respectful and kind to each other, how to conceive their children in love, and then to deliver and nurture them with respect to their specific times, timings, elements, needs and potentials.

The studies of time and synchronicity in the life-sciences are in their infancy. We are also just making first steps in the systematic exploration of our four-element nature. Of course, there might be many surprises on a long road to a more conscious, harmonious and respectful childbearing and raising, but a start has been made. Let this journey be auspicious for all the wanderers.

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