

Konstantin Tsiolkovsky Theorems of Life (As an Addendum and Clarification on Monism)

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I will not stop attempting to understand what is most important to a conscious being: (1) subjective continuity of life; (2) its limitlessness in either direction; and (3) its bliss. All this, so to speak, is refuted by biological life on Earth. So as not to succumb to this misconception, we need to look at life from the height of space. Here I present only sixteen theorems of life. Matter is considered to be devoid of feeling by the majority of people. We do not agree with this. That is why we call any part of matter spirit.

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6th theorem: An animal is a particular combination of simple spirits.

7th theorem: Every animal or complex spirit consists of a multitude of spirits of varying complexity (atoms, molecules, cells, their aggregate, the whole animal).

8th theorem: The death of an animal is the destruction or discord of this combination, and the creation of more elemental, or even simpler, spirits.

9th theorem: Inversely, the birth of an animal or a plant is the formation of this combination from elemental spirits.

10th theorem: The wealth of spirit depends on its mass and organization.

11th theorem: The complexity of spirit is, generally, proportional to its mass.

12th theorem: A particle of matter, of any size, feels.

13th theorem: Chemical, physical, and mechanical phenomena determine the life of a spirit.

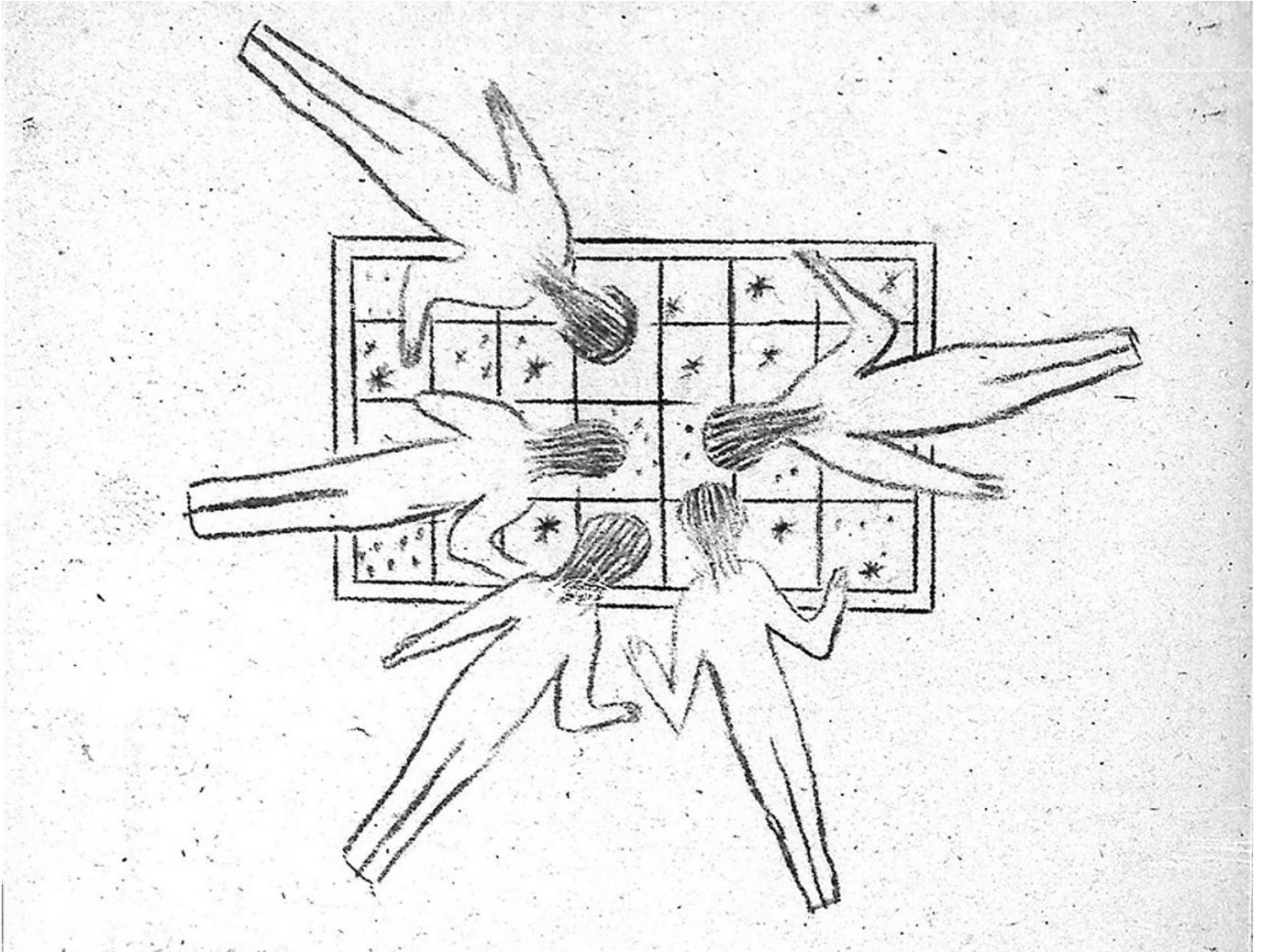
14th theorem: Where there is matter, there is also spirit.

15th theorem: The illusion of being inside a body from birth to death.

16th theorem: The illusion of unity.

1st TRUTH: ALL MATTER IS ALIVE AT ITS CORE.

All animals and plants feel. Can I doubt that my brother and my friend feel? The highest of animals express their pain and joy with shouts in their own language, which is incomprehensible to humans. (The language of several monkeys has been decoded; chicken breeders understand the language of chickens, and so on.) The lowest



A drawing from Tsiolkovsky's 1933 manuscript "Album of Space Travel" (p. 43) portrays floating people looking at stars through a window.

express their pain and joy with body movements. It is impossible to doubt, in general, that animals and plants have feelings, even single-celled organisms.

LET'S PROVISIONALLY DEFINE THAT PART OF THE WORLD OR THAT BODY THAT CAN FEEL HAPPINESS AND SORROW AS SPIRIT.

Then we can say: where there is an animal or a human, there is spirit.

Therefore, there are many spirits, and will be perhaps even more, because the number of beings on Earth can increase indefinitely.

Moreover, since all matter, by way of an embryo (an egg), turns into an animal, then all matter is alive at its core as long as there is enough enlivening energy (for example, the rays of the sun or the chemical energy of food).

However, one could object that these earthly animals consist of only twenty to eighty chemical compounds rather than all ninety-two, and that not all parts of matter can therefore be considered alive.

We can respond to this by saying that under different temperature conditions – radial energy, environment composition, and so on – other elements would also successfully take part in building organisms, as those twenty to thirty do (see my “Animal of the Cosmos” and L. L. Andreenko’s “Life on Planets” in French).

Moreover, it is known that elements in the universe transform into one another, and that is why atoms of gold, iridium, and so on can form atoms of nitrogen, carbonate, and so on – which, as we well know, contribute to life.

2nd TRUTH: NO ATOM IN THE UNIVERSE CAN AVOID A DIFFICULT LIFE.

Planets and suns are destroyed, mixed, created again; all matter (the elements) transforms. Therefore, no single particle of matter can avoid having already been part of something living and having already participated in life. For example, some time ago, the Earth and all that is on it was part of the Sun. Our bodies were also part of it. But this did not in any way prevent our bodies from becoming alive.

Even now, the origin or source of all elements is considered to be electrons or protons, and with the development of science they may find a single origin for all types of matter.

Here it becomes apparent that all matter is alive at its core, because it is uniform and has one origin (though science for now supposes two origins – protons and electrons, or positive and negative electricity – the conclusion remains the same).

3rd TRUTH: A MASS OF ANY SIZE CAN PRODUCE SPIRIT.

Nature creates large animals, such as the elephant and the whale, and small ones, like ciliates, insects, and so on. They all feel joy and sorrow, and therefore they are all spirits.

Thus, the existence of spirit is not confined to some definite minimal mass of matter. Both large and small masses can produce spirit. From the latter follows:

4th TRUTH: THE BASIC, MINIMAL SPIRIT IS A SEPARATE ELEMENT OF MATTER: atom, electron, ether, or other unknown and uniform essence of matter.

This frequently brings about a wrong conclusion, where the atom is ascribed the qualities of some other brain with very complex, animal qualities: memory, reason, consciousness, physical force, and so on. This is a deep misconception.

The atom is only an atom, with all of its scientifically known and unknown mechanical qualities. It can be compared to the solar system. There is no equivalence or likeness here. But I would like to point out its mechanical nature.

An atom is relatively passive and only reflects the influence of its environment. When it is in a nonorganic environment, it can be compared to a still record. When it is in an organic environment, it can be compared to an oscillating or playing record. It is also this way in the brain. The record is as passive as an atom. When the record is oscillating under the influence of some force, it talks, laughs, sings, barks, replaces an orchestra, etc. Likewise, an atom in the brain of an animal experiences the influence of the ethereal oscillations surrounding it in its brain (under the influence of the brain's activity), manifesting in a passive feeling of life.

However, even in the brain, an atom does not control the spirit: it remains passive. It is a brick in a building, or a particle of steel in a working machine. What controls the body and the mechanisms of being is its complex machinery, i.e., the aggregate of all atoms in the body.

5th TRUTH: THE WHOLE UNIVERSE CONSISTS OF ELEMENTAL AND COMPLEX SPIRITS.

For example: sunlight or fog consists only of elemental spirits while planets, on their surfaces, have created plants and animals, i.e., complex spirits.

6th TRUTH: A LIVING ORGANISM IS COMPOSED OF A GROUP OF SPIRITS COMBINED IN A VERY PARTICULAR WAY.

From here follows:

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7th TRUTH: EVERY ANIMAL OR COMPLEX SPIRIT IS COMPOSED OF A MULTITUDE OF SPIRITS OF DIFFERENT LEVELS OF COMPLEXITY (atoms, molecules, cells, their aggregate, and everything living) THAT FEEL IN UNIQUE AND SEPARATE WAYS.

8th TRUTH: THE DEATH OF AN ANIMAL OR A PLANT IS THE DISINTEGRATION OF COMPLEX SPIRITS INTO THOSE THAT ARE MORE SIMPLE OR ELEMENTAL.

After the general life of a body stops, its cells still live a little longer and even reproduce. After the cells are destroyed, only molecular and atomic life remains.

9th TRUTH: BIRTH IS THE COMBINATION OF VARIOUS SPIRITS INTO A SINGLE WHOLE.

This is a union, or association, of elemental and complex spirits into a more or less complex combination.

Birth begins immediately after death with the reproduction of bacteria and other more complex organisms, into which the matter of a body is transformed, i.e., atoms of primitive spirits.

In some cases they are soon destroyed, leaving only atomic life. These primitive spirit-molecules and atoms enter the surface of the Earth and the atmosphere, and even prior to that, enter the composition of plant cells and begin cellular life. Then from grass and other plants they enter the bodies of more complex beings to live the life of unified cells, i.e., they transition into the composition of various animals and humans.

10th TRUTH: THE POWER OF SPIRIT, OR THE WEALTH OF SPIRIT, DEPENDS ON ITS MASS AND ITS ORGANIZATION.

For example, in descending order, based on their complexity, the spirits will be: the highest descendant of humans, humans, apes, dogs, fish, insects, infusoria, bacteria, molecules, atoms, and so on.

11th TRUTH: THE HIGHER THE MASS OF AN ANIMAL, THE MORE COMPLEX THE SPIRIT (IN GENERAL, ON AVERAGE).

The more complex the vehicle, the more matter it requires, even though sometimes the opposite happens. In this way, a watch is more complex than other massive machines.

However, if we tried to achieve maximum complexity, it would generally grow with additional material we are given for a machine.

Nature also strives for the highest perfection, which is only possible with the highest complexity of an organism for its given

mass. The complexity of machines is highly constrained by mass, due to the large size of human hands and the large tools they use. However, nature's creations go much smaller with respect to scale. The scale can become microscopically small. However, even nature has limits due to the particular size of an atom, and especially in the particularities of complex molecules. Therefore, the most insignificant cell has a much more complex substance than all that is produced by man. That is why each mosquito is more complex than our most intricate machines.

It is therefore clear that the larger the mass of an animal, the more opportunity it has to be complex and perfect. Of course there are exceptions, as there are for human creations: for example, an elephant and a whale are more simple in their design than a human, and are therefore less intelligent. The same is true of the abundance of massive animals (for example, fish).

However, the organ of the mind is not the whole body, but simply the brain, and its size correlates more closely with the perfection of thought, even though here there are also many exceptions. Thus, people of genius frequently have an average-sized brain. Here, the complexity is in the form, the organization of the organ of thought, so to speak – in the quality of the brain.

However, there are still fewer deviations from the above law in the world of animals than there are in the area of human creation.

Thus, an elephant is one of the smartest animals. If it is less smart than a human, it is only because its brain is more simple.

The size of animals, of course, draws attention as the reason for the complexity of the body and the development of the brain. However, in order to avoid mistakes, one needs to pay attention to the quantity of nerve knots (ganglia) in the brain, which are responsible for memory and thinking. The brain of an elephant can be larger in size than a human's but its organization is still more simple.

A large body, its central management, of course, also increases the volume of the brain. But its main part goes, apparently, to the mind and its elements: memory, thinking, creativity, and so on.

The scope of an animal's feelings, i.e., its ability to suffer and to be happy, is also dependent on the number of nerve knots. We have shown this many times (see my "Mind and Passions").

Single-celled organisms are just one chemical plant with complete spiritual equilibrium (when compared to humans). They do not have a nervous system. Insects already feel

the sting of life. Fish are capable of feeling more suffering and joy. Overall, the larger the brain of an animal, the higher the amplitude of life's oscillations. A human being, in this respect, as in many other things, seems to represent an apex. The particularities (individuality) of a type have a great deal of influence on the oscillations of well-being.

12th TRUTH: IN A MATHEMATICAL SENSE, EVERY PARTICLE OF MATTER, IN NONORGANIC AND ORGANIC FORM, FEELS.

Indeed, in the universe we see (1) mammals (for example, humans, dogs, rats, lions), beginning with the most complex (human) and ending with the simplest (mouse, and so on); (2) birds; (3) lizards; (4) amphibians; (5) fish; (6) mollusks; (7) insects; (8) worms; (9) single-celled organisms; (10) bacteria; (11) plants; (12) organic compounds; (13) nonorganic; (14) the ninety-two elements; (15) protons and charged particles; (16) hypothetically unified origins of matter (provisionally, ether).

Where in this list does the feeling of life begin and end: The ability to reason, to feel happiness and sorrow, to respond to nature's influence?

Is it only humans who can think, or does this ability stop with a dog, a rat? Can anyone then deny that in nature we have a continuous chain, the links of which differ only quantitatively?

Likewise, is it possible to determine the boundary of the feeling of life – joy, sorrow? And here various beings differ only quantitatively.

Finally, the response of "dead" nature is exactly the same as that of the living.

Temperature, pressure, movement, electricity, the chemical influence of the environment, and so on – all this, in the qualitative sense, equally influences both dead and living matter. A wealth of material on these events has accumulated, which undoubtedly confirms that external manifestations of "dead" matter are equal to those of the "living."

13th TRUTH: CHEMICAL, PHYSICAL, AND MECHANICAL PHENOMENA (in relation to the mechanics of the body) PRODUCE LIFE WITH ITS QUALITIES: to feel pleasant and unpleasant, to think, to move.

Perhaps they will tell me chemical, physical, and mechanical phenomena exist everywhere. Therefore, according to you, life is everywhere!

Yes, it is truly so, but what kind of life? Where there is no complex mechanism (such as the Sun) life is disorganized, primitive, and only represents the life of spirit-atoms, which is very simple and without any of the brain's influence. Within a chemical process there is the same

exact life of separate atoms. In a piece of stone or metal there is also primitive, separate life. In a complex machine – for example, a calculating one – the chemical reaction is lacking, and in bacteria the brain and its intricate activity are absent.

An animal is a combination of a mechanism and chemical actions. In the simplest of creatures the chemical life is complex, but the mechanism is simple. The higher the animal on the biological ladder, the greater its chemical quality, and the more intricate its mechanism. Both of these are revealed by its feelings of joy and sorrow and by the complex phenomena of memory, thinking, ideas, and muscle activities.

Thus, a complex animal is the combination of a mechanism and its chemical qualities. The latter produces feeling, while the mechanism informs us about it. In the simplest of creatures the mechanism is so simple that it cannot tell us anything about the feeling of a cell. Neither can an atom tell us anything about itself. In the simplest of our machines the chemical composition is simple, while the mechanism cannot compare to the mechanism of a fly. Also, the life of a machine is weak. The mechanism by itself cannot produce noticeable life, while its chemical composition alone cannot inform us about it.

14th TRUTH: WHERE THERE IS MATTER, THERE IS FEELING.

We have seen that the simplest of spirits is an atom, or a part of it. Its life is unimaginably simple and passive (i.e., it is mechanical, depending mostly not on the atom itself, but on the environment and its influence). Where there is an atom, there is feeling. An atom wanders in space, and with it, the feeling of life also wanders.

The same pertains to a complex spirit: its unified feeling can be found where there is an animal. The animal wanders – and its feeling of sorrow and happiness follows it. A bird flies – and with it flies the space of its perceptions.

This is clear as far as an atom is concerned, but it is not clear in relation to the animal. But let's look at the atom first.

How does an atom, or a primordial spirit, wander in the universe? Due to their known and incessant movement, atoms – the essence of matter – move into suns, planets, their centers, all celestial bodies, the ether, other milky ways, animals, plants, higher beings, etc.

In inorganic bodies the atom is like a wanderer who travels sleepily without any impressions in an unvaried, limitless desert similar to a sea. Here it is in a state of nonbeing.

When it enters the bodies of animals, it is like vacationing in hotels of the most wide-

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ranging quality. Here it transitions into being and perceives what animals perceive.

It is harder to understand an animal. Matter moves in it throughout its life, as water moves in a river. The river remains the Volga River, but the liquid in it is different each year.

An animal is similar to a building constructed from the simplest of spirit atoms. But these atoms are constantly leaving the building and going outside, being replaced by new atoms that have just entered from the animal's environment. They become alive when they enter an organism, while the atoms departing from it enter nonbeing – the simplest state. The organism is renewed hundreds of times during the life of an animal, i.e., its atoms change a hundred times over. Having lived several days, they leave and are replaced by new ones (metabolism).

15th TRUTH: IF FEELING IS TO BE FOUND WHERE MATTER IS, THEN ANYTHING LIVING, AT THE VERY LEAST A HUMAN BEING, CONSIDERS HIS FEELING TO RESIDE IN HIS BODY THROUGHOUT HIS WHOLE LIFE.

He says, "I remember myself from the time I was two years old and I will certainly remain (i.e., will live) until my body is destroyed."

But how can this be, if matter leaves the body hundreds of times and continues to be replaced by new matter? The feeling should also run away.

This is one of the illusions that is similar to the one where the sky with its stars appears to move.

When my atoms leave my body, I cannot convey this any more than someone else can convey to me his continuous existence within his body.

Memory consists of a part of the brain constructed under the influence of life's events. When foreign atom-spirits enter the brain, they feel the influence of this part of the brain and remember what they have not experienced, but what the body has at some point experienced, or what was experienced by the atoms that were once part of it, and that have since left – the primitive spirits. Likewise, our thoughts about the future, which comprise a part of the brain, make us think about the unavoidable future and death, which we will probably never experience, for atoms (and together with them our primitive spirit) will leave the body in several months and will not experience the feelings of death or even the near future (for example, the next year). The spirit of childhood will not experience the feelings of adolescence. We needlessly fear the agony of death for a reason: it will be experienced by other spirits, and not the atoms of the current body.

It is very hard for a human to abandon these misconceptions, as it is hard for him to abandon the perceptions of the sky, the movement of the stars, and the static state of the Earth.

16th TRUTH: WE THINK THAT IN EVERY BODY THERE IS ONE BEING.

The rational organization of an animal demands, as does the good organization of the state, a single management, a single will, to which animals and society will submit themselves. The latter is ruled by a single law; the animal is ruled by a single brain. If the animal had two wills, they would contradict each other and decrease the power of being, as happens with indecisive people. They do not know how to act, and inactivity and weakness result. Likewise, two governments cannot successfully rule the country, for they would not be in accord and would weaken each other. The scourge of humankind is its rule not by one will, but by many, which is why wars and other types of self-destruction happen.

That is why an animal that has a singular administration, singular will, is perceived to be unified, as the French king thought himself to be the state.

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Despite producing approximately 150 manuscripts on cosmic philosophy, Tsiolkovsky published only two such works during his lifetime, Monism of the Universe (Monizm Vselennoi, 1925, 1931) and The Cause of the Cosmos (Prichina Kosmosa, 1928). Both editions of Monism of the Universe were self-published in the city of Kaluga, each in editions of two thousand. Neither included "Theorems of Life." This piece was written as the addendum and clarification to the original book, and was typewritten (rather than printed) from 1928–30 with the author's handwritten remarks, and is now stored in the Russian Science Academy archives (Foundation no. 555, Inventory 1, Case no. 430). It seems that "Theorems of Life" was published for the first time only in 2001 in Циолковский К.Э., Космическая философия (K.E. Tsiolkovsky, Cosmic Philosophy).

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Konstantin Tsiolkovsky (1857–1935) was a Russian physicist and philosopher best known for mathematically formulating the fundamentals of modern astronautics.

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