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ORIGINAL PAPER

EVOLUTION DOES NOT WIPE OUT ITS TRACES, BUT KEEPS THEM FUNCTIONAL

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Abstract. Life has planted itself the roots deplz as far as in the subatomic structures, it selected the necesarz chemical elements, it learned the harmony, symetry and perfection from the crystals and it toak over from the three prebiological evolutive levels a multitude of information and patterns, making from evolution a global and unitary phenomenon. Biological evolution is not above the other evolutive levels and does not function independently. In what follows we will present the new fundamental low of evolution: THE EVOLUTION DOES NOT LOSE ITS TRACES, BUT KEEPS THEM FUNCTIONAL**.**
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Key words: prebiological evolution, biological, spiritual, fundamental laws.

Introduction

The theory of evolution was launched by Jean Baptiste Lamarck, in 1809, as the theory of transformation, presented with arguments in his book titled Philosophie Zoologique. We could, however, consider that this theory was offered to the general public too early, without the public being ready for such a turning point in their thinking. The species transformation under the influence of the environmental conditions (both external and internal circumstances) is nothing but evolution.

The successful launching of the theory of evolution, an outstanding success when it emerged 50 years later, through Charles Darwin's theory, when his main book The Origin of Species (The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life) was published.

The success was triumphant, worldwide, from the very first moment of its presentation by Ch. Darwin. We may consider this success to be preserved even nowadays, although multiple other theories emerged during the years (over 150 years) influenced by Lamarck, Darwin, Neo-Darwinist, anti-Darwinist etc. The

Synthetic Theory of Evolution (STE) has been trying, by any means, to find other mechanisms of transformation of species than the ones conceived by Darwin.

The Theory of Evolution has been a breakthrough both for the biological and for the philosophical thinking and has triggered strong controversies, which couldn't find their place in the history of science, and some anti-evolutionists nowadays state, with an easiness that is hard to understand and to accept, that the evolution does not exist as a cosmic phenomenon and that the evolutionism should be eliminated from human thinking. Some of these people don't even know the difference between evolution and evolutionism. Nowadays, they are no longer searching for arguments to prove the theory of evolution as false, they proceed to the denigration of this conception through awful rejections, without any scientific arguments, by bringing other theories into discussion or praising the scientific creationism. The important fact is that the Evolutions did not fall, as a country's government and will not fall either.

This kind of „experts", „scholars" is of no interest to us and we consider that the evolution is a cosmic reality, which characterizes not only the living world, but the whole material and spiritual world.

As an evolutionist by conviction and by profession (I used to teach the Evolutionism at the Faculty of Biology of the „Al. I. Cuza" University in Iaşi), not only I endorse the laws of evolution, but I want to bring to light a new law, which has not been formulated yet, but it is nonetheless as valid as the known laws of evolution and even as the two laws of Thermodynamics.

Biological evolution

The concept of evolution defines both the cosmos as well as the material and spiritual infinity, because any material system is dynamic, in a constant transformation or becoming of its features, in an endless flow (Panta Rhei), as Heraclitus considered. His disciple Cratylos surprised the perpetual flow of the systems in his aphorism "*you cannot bathe twice in the same river."*

If till to Charles Bonnet (1762) the term of evolution was used for the characterization of ontogenesis, he confers to evolution phylogenetic dimensions.

Darwin broadens the term of evolution conferring it the attribute of universality. He substantiates the hypothesis in conformity with which all the organisms underwent major transformations over the geologic time, which ensured biological progress on the one hand and, on the other hand, the survival of species.

Evolution is a cosmic reality and it is not characteristic only to the vital energy (living beings), but to the whole material world.

Some evidences are so obvious, that you can ask yourself why they are not seen and recognized by some of the so-called connoisseurs of the vital field, who attempt to reject the concept of evolution?
Let's follow the formation of the digestive tube in the group of Turbellaria in the phylum of Plathelminthes.

In the most primitive forms of Acoella it is not individualized a digestive tube. The organisms present an opening mouth, but the food enters directly into a digestive syncytial tissue associated with the body parenchyma, as it is in *Nemertoderma bathycola* (Fig. 1).

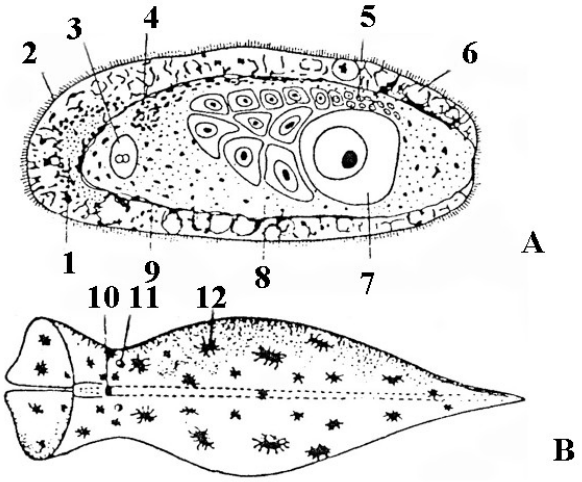


Fig. 1. A – *Nemertoderma bathycola*; B – *Convoluta hipparchia*: 1-fore concentrations of neurons; 2- epitelium; 3- statocist; 4- testis; 5- ovary; 6- tegumentary gland ; 7- ovule; 8- parenchima; 9- subtegumentary muscle layers ; 10-buccal orifice ; 11- eyes ; 12 - pigmentary cells.

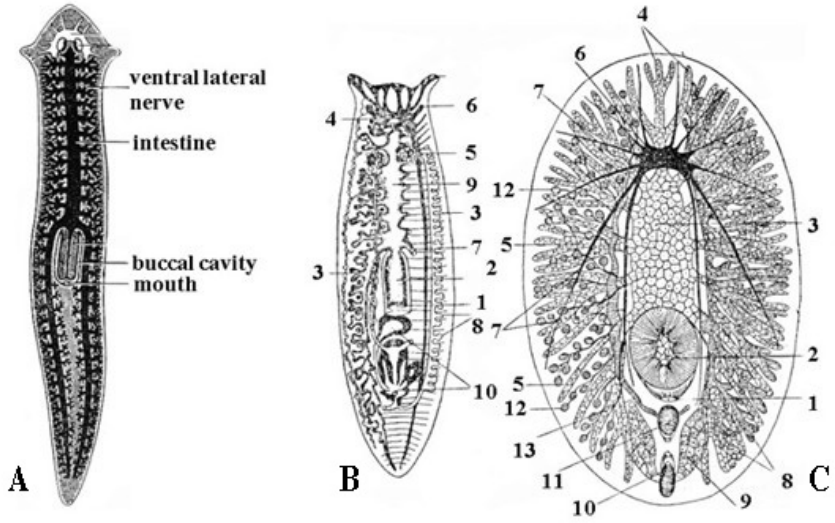
(Radu and Radu, 1967)

In **Rhabdocoella**, for the first time, it is individualized a digestive tube, which appears as a straight tube, closed at the bottom of a bag, hence the group name. The digestive tube extends in a straight line like a little rod (Fig. 2A and B).

In **Aloeocoella**, it is found an evolutive leap in terms of the structure of the digestive tube. The intestine has three branches: one in front of the body and two that focus to the posterior part. The posterior branches are merged to form a ring around the pharynx (peripharyngeal ring), as it is the case in *Bothrioplana semperi* (Fig. 2 C).

An evident progress is in the species of the order **Tricladida** whose digestive tube has three well individualized branches; a branch oriented to the anterior part and two to the posterior part. All branches have numerous lateral diverticula

forming a pseudometamery. Among the diverticula of the digestive tube, there are found the testicular follicles, as it is the case in *Dugesia* (Fig. 2 D and Fig. 3 A).



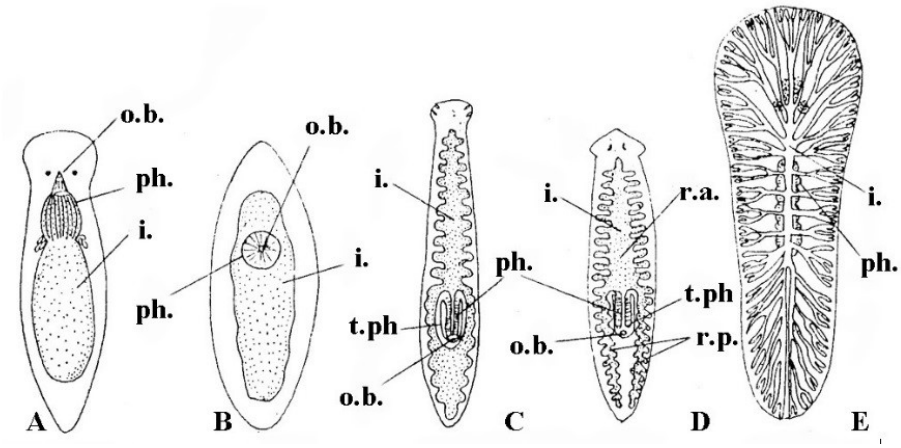


Fig. 2. The digestive system in Turbellaria : A and B in Rhabdocoella, C in Aloeocoella, D in Tricladida and E in Polycladidai – intestine; ph – pharynx; .b.0. – buccal orifice ; t.ph. –pharyngeal pod ; u.r. – upper ramus; r.a. –anterior ramus of the intestine (A, Barnes, 1968; B, Karling, Mack-Firă, Dörjes; C-E Hyman, 1951)

Fig. 3. A. Digestia. The digestive apparatus and the nervous system (Natali, 1954); B. C. Digestive tube of Triclade policladeB: *Procerodes lobata*:1-mouth 2-pharynx;3- branches of the intestine ; 4-ganglioni cerebroizi; 5-eyes; 6-tentacule; 7-longitudinal nervous cord; 8-vitelligenous glands; 9-ovary; 10-genital apparatus;C: *Leptoplana tremellaris*: 1-mouth; 2-pharynx; 3-central part of the intestine; 4 and 5 – Lateral branches of the intestine ; 6-cerebroid ganglia ; 7-radial nerve cords ; 8-parties of the ovary ; 9-uterus, 10-female genital orifice ; 11-copulatory organ;12-testes; 13-spermiduct
(according to V.F. Natali, 1954)

In the order *Polycladida*, the intestine presents several branches, which are arranged more or less radial, as in *Leptoplana tremellaris* (Fig. 4 B).The development and the ramification of the digestive tube can be perfectly correlated with the significant increase of the body mass in Turbelarians. The digestive tube takes over the function of circulation too, in the acoelomate animals. We can talk about the gradual constitution of gastrovascular apparatus.

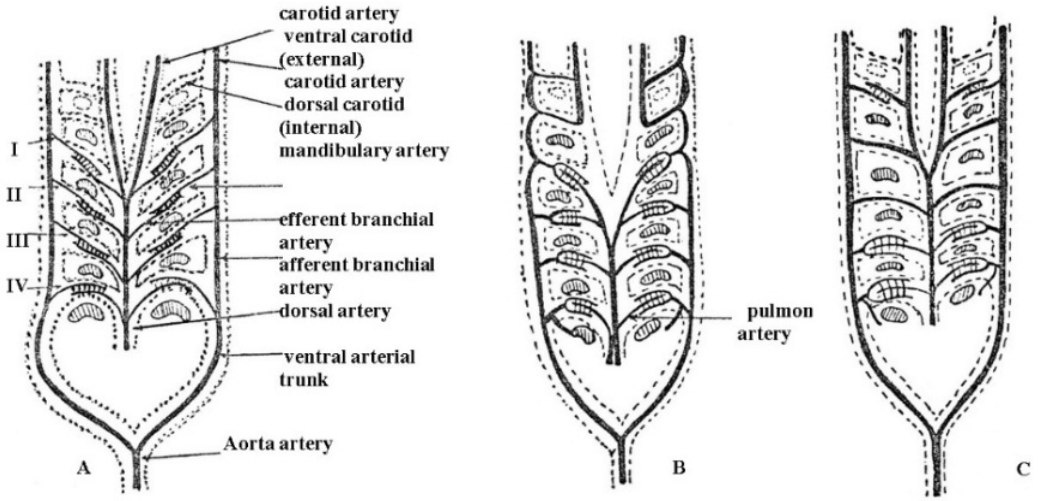


Fig. 4. Evoluion of arterial arches in fish : A – Arterial arches in Teleostei; B –Arterial arches in Neoceratodus (Dipnoi)
C – Arterial arches in Protopterus (According to Giersberg, 1968)

What impresses and we must emphasize this, is the fact that all evolutive stages of the digestive tube are kept in a functional state in the present nature in different species. No phase has been eliminated as being inadequate, none is a waste of evolution. On the contrary, in every stage, the evolution is appropriate to the life way of these animals and especially their life claims in the environment in which they live, correlated with the body dimension.

Evolution does not wipe out its traces, evolution does not swallow its sons like Chronos; all the stages of evolution are kept in nature as being functional.

The evolution of aortic arches in the series of Vertebrates

The model of the arterial arches in fish is at the basis of all vertebrates, including humans. This aspect can be followed both in ontogenesis and in the final disposal of the aortic arches in adults (Fig. 4 and 5).

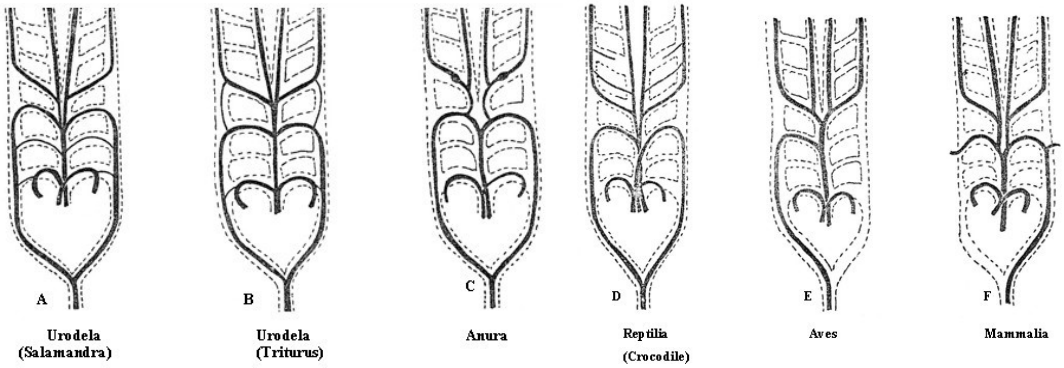


Fig. 5. Evolution of the arterial arches in Tetrapoda (according to Geiersberg, 1968)

That the evolution of the arterial arches in Vertebrates is achieved according to a unique model is proved by the fact that in human too, in ontogenesis, it is respected the same model. More than that, even in humans, in some teratological cases, one can keep the communication between the two atria through the orifice of Botallo (reminding of the Botallo's channel from Reptiles), causing the so-called **blue disease,** due to the fact that a mixing of oxygenated blood with that deoxygenated takes place. Moreover, in teratological cases, one can maintain the communication between the ventricles through the Panizza's orifice.

The appeared modifications in the disposition of the arterial arches must be correlated, necessarily, with the correlative modifications appeared in the structure of the heart in each class of Vertebrates.

A question seems natural: if these morpho-functional transformations reached the functional optimum in Birds and Mammals, then, why are the transitional forms retained in nature? Why were all the stages in the evolution of arterial arches kept functional in nature? Starting from the primitive model of the aortic arches from Fish, we find the effectuated modifications stage by stage in their evolution up to Birds and Mammals. Each stage is kept as being functional even in the present stage of evolution. Some consider that all the structures situated below the evolutive stages of Birds and Mammals would be some wastes that should be removed from the existence of the present animals. Forcing the things, some of them would intervene and would achieve a genetic improvement of structures considered by them as being inadequate.

The reality is that for all these groups the structure of aortic arches is more or less perfectly appropriate to their claims to life (their way of living).

The scheme of evolution of the arterial archers in Fish seems to be archaic. We must recognize, however, that as in case of Fish, we find and obsolete phase, the transition from six pairs of arterial archers to four pairs. In Fish too, we feel that modification appeared in the structure of arterial archers depending on the

appearance of the lungs. The Fish were overcome in the evolution by all other vertebrate groups. But can someone affirm that Fish are wastes of evolution, wastes of nature? Can you affirm that Fish do not feel well in their life environment? Can you not remain impressed by the performances of predators of the sharks? In the systematic hierarchy of the Fish, each group was at the top of evolution. In the same way, we must think in terms of Batrachians and Reptiles. Should nature keep in the present fauna of the Anthropogenic, only Birds and Mammals, the other ones being wastes of evolution?

Arthropoda the circulatory system

At Arthropoda the circulatory system is following the same pattern as in Annelids. The Annelids dorsal vessel is homologous to that from Annelids (Fig. 6).

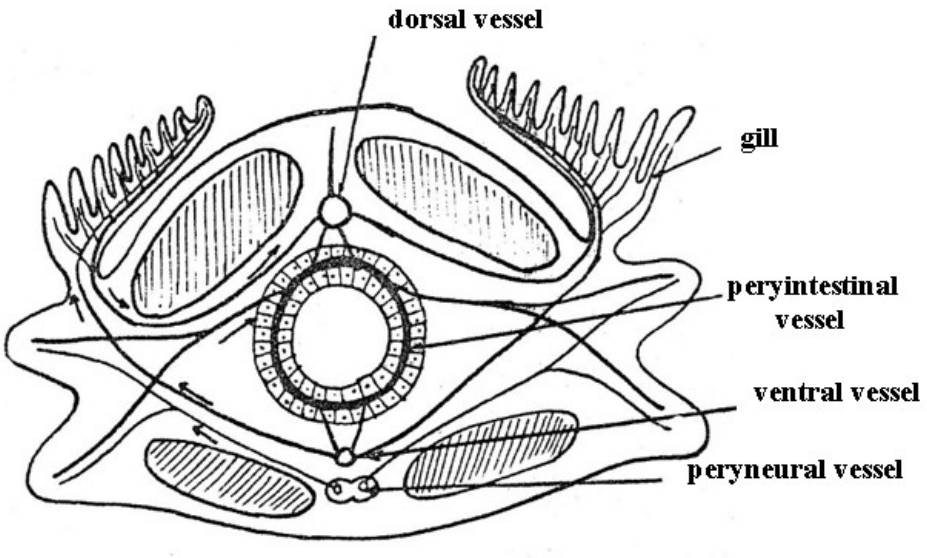


Fig. 6. The scheme of circulation at the level of a segment of anelid (according to Radu, 1967)

In most primitive cases, in all the groups, the dorsal vessel stretches over the entire length of the body. The vessel network is particularly rich in *Limulus mollucanus*; just the capillary vessels miss . The heart is well developed and is located on the dorsal vessel (Fig. 7 A).

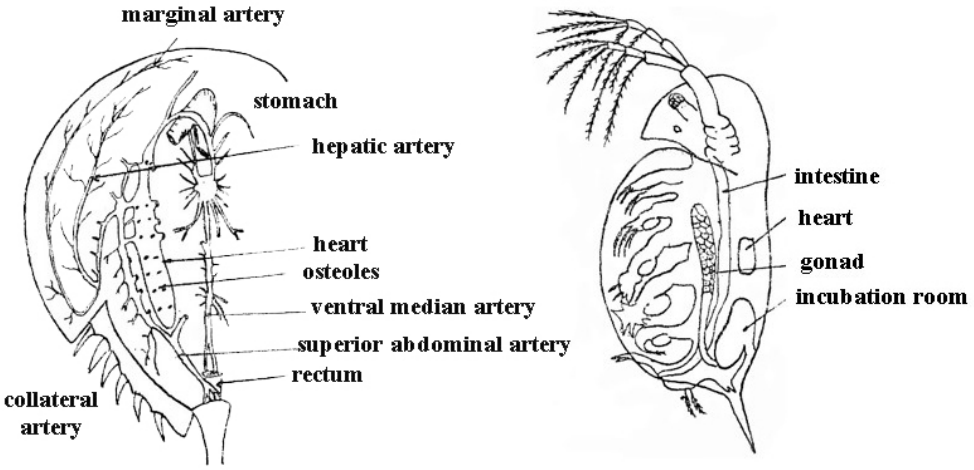


Fig. 7. A. Scheme of the circulatory apparatus in Limulus (according to Kaestner, 1963-1965); B. The circulatory apparatus in Daphnia (according to Radu, 1967)

A similar situation is encountered too in Scorpions, in Stomatopoda among Crustaceans, in Chilopoda and Diplopoda among Mirriapoda and even in Blattoptera among Insects. The primitive forms of Arthropoda have large dimensions, some of them being just huge and the network of vessels very complex. We can find two very interesting aspects in the evolution of Arthropoda:

- reduction to the disappearance of the circulatory apparatus
- correlative decrease of the body size reaching down to microscopic forms.

Out of the whole circulatory apparatus only the heart remains in some Cladocerans (Fig. 7) and Gamasids among Crustaceans, or any trace of the circulatory apparatus disappears as in some Copepods and Ostracods among Crustaceans and many species of mites (Acarina, Chelicerata).

Is this a regressive evolution, an involution? Certainly not. In the series of Arthropods we can surprise a spectacular evolution of the nervous system, which starts from a nervous system of scalariform type in the primitive forms, similar to that of annelids, with which it presents evident phylogenetic affinities.

What is very important in our understanding is that in all the groups of Arthropods, in the present fauna, there are kept all the stages that prove the reduction to disappearance of the circulatory apparatus. From *Limulus mollucanus* of Xifozures to *Sarcoptes scabiae* or *Acarus siro*, among mites, we meet all the stages of simplification of the circulatory apparatus to the disappearance and reduction of the body size to refusal.

Colonial integration

But, we notice a spectacular evolutive leap in the transition from the solitary individuals to colony within the chlorophyceae algae.

It seems accredited the hypothesis that the transition from the unicellular organisms to those pluricellular ones was realised by the colonial forms. Surely, the association of cells and the formation of some colony present important adaptative and evolutive advantages. If it was not so, then we could not explain the existence of simple colonies, with a small number of cells. If *Chlamydomonas angulata* is a solitary unicellular species (Fig. 8), *Pleurococcus vulgaris* forms a colony only of two cells. Cells are perfectly identical and are connected by plasmodesmata. If the cells are separated and live independently they can rebuild their colony.

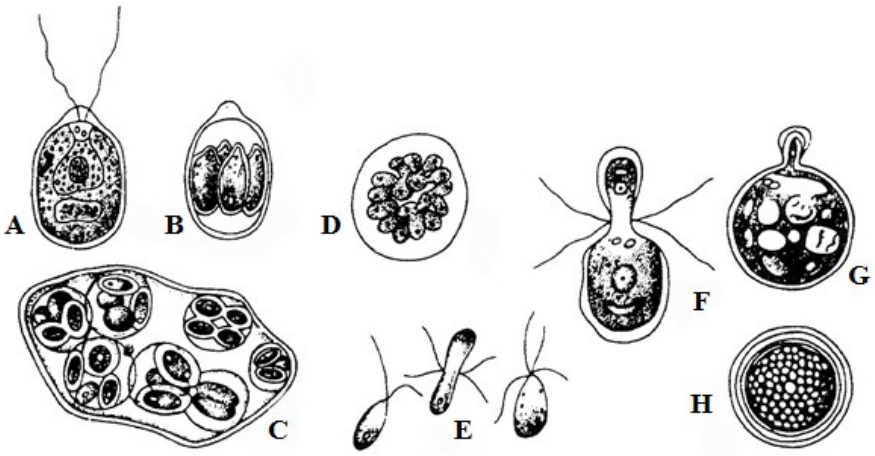


Fig. 8. *Chlamidomonas angulata*: A-vegetative state; B- asexual propagation stage; formation of 4 new cells;
C- palmelar stage; D-formation of gametes; E-isogametes and their isogamia; F-close merger heterogametes;
G-oogamia; H-zygote (according to E. Ghişa, 1964)

Colonies are gradually complicating : 4 cells at *Gonium sociale*, 8 cells at *Pandorina morum*, 16 cells at *Gonium pectorale*, 32 cells at *Eudorina elegans* etc (Fig. 9).

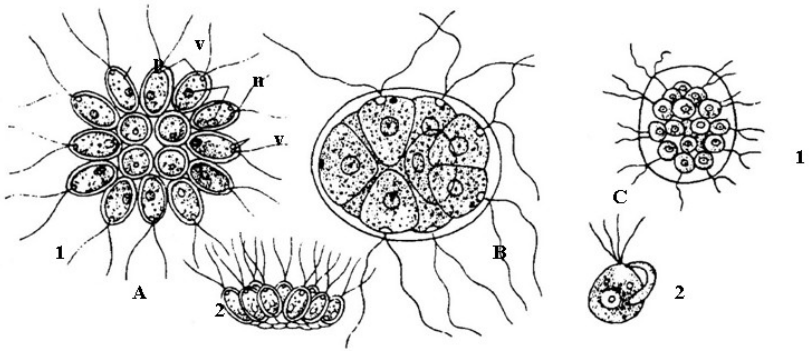


Fig. 9. A – Gonium pectorale, colony seen by above (1)and lateral (2); p – protoplasma; n – nucleus; v – vacuoles;
B – Pandorina morum, a colony of 16 cells ; C – Eudorina, (1) adjacent (2) gametes in copulation (according to E. Ghişa, 1964)

At *Volvox globator* the colonyes reach 16000 cells (Fig. 10).

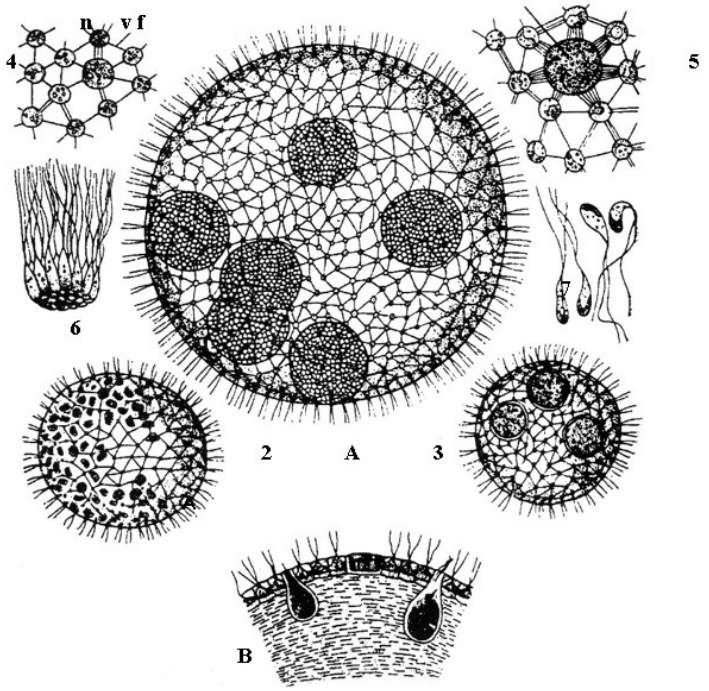


Fig. 10. A. *Volvox aureus*: 1 – colony fully developed with six other colonies -fiice appeared on the vegetative path ; 2 – colony with antherozoids ; 3 – colony with 3 oospheres; 4 – a part from a colony with spermatogenous cell (anteridial); 5 – idem, with a oogonial cell (oophere); 6 – form of antherozoids ; 7 –free antherozoids ; B. *Volvox globator*: un sector in colony (according to E. Ghişa, 1964)

The fact that the cells associate to live together, it means that they prefer this thing that it is a reaction of attraction, of partnership, not one of rejection. When the number of cells is very small, each keeps its structural and functional peculiarities. The whole wins, however, something. If the number of cells in the colony is higher, there starts to appear some morpho-functional differentiations and then even behavioural. In the colony formed of 16 cells, a morphological shaft differentiates, which means the first more important step on the way of colonial integration - the orientation of colony. Though the cells can live isolated, in this case too, it is manifested, however, a constant structure of the colony. The different position of cells within the colony causes the appearance of some morpho-functional modifications. These are accentuated together with the increase of colonial integration.

A question persists in our mind: how some colonies formed millions of years ago, on the aggregation path, remained at the level of 2, 4, 8 or 16 cells, even if it is a game of the number of cells? If the colonial form offers an advantage, why did not they evolve to larger colonies?

As we realize, every step in the building of colonies has been kept, it was frozen. It is as if in each stage the respective form is sufficient for it. It does not need more. A superior stage already means something else. Nothing is lost from that it was created. Some species have the value like the exhibits in the Museum of wax figurines, as if they wanted to mark our path that started in the strategy of building of large colonies and in the appearance of the pluricellular organisms. The existence of each step in the building of the colonial forms in the present living world, proves us the fact that evolution does not wipe out the traces, but keeps them functional in each attempt. We believe it is wrong to use the term of attempt. There are not attempts in the evolution of living world, but different variants, of which some, the most successful and efficient, open the path of the morpho-functional progress and of the biological progress.

Analyzing the aspects for discussion, a fundamental discovery is revealed to us - in nature it functions a general biological law that has not been discovered till now, or rather it was not formulated precisely, namely: evolution does not wipe out its traces, but keeps them functional.

The evolution of chemical elements

It is amazing to analyze the periodic system of elements and to do the necessary correlations with the material world. When I was a high school student and learnt chemistry, some elements from the periodic table of elements were missing; they were not yet known, but they had their boxes, with all the chemical and physical characteristics. I did not know about the so-called **The Big chain of beings**, which sanctions the principle of continuity in nature, surprised by Aristotle.

The periodic system of elements is nothing else but a **Big chain of chemical elements,** which goes from stage to stage, without any empty space, or box (in the situation in which free boxes appear, it means that the respective elements have not yet been discovered, being hypothetical, but they have a real existence in nature). Here we discover the function, at an ideal mode, of the **principle of continuity**. This principle leads easily to the idea of evolution.

In this Big chain of chemical elements we can start from hydrogen, which is the first and most simple chemical element, in order to reach the last known or unknown element for the time being.

Even if hydrogen has one proton in the atomic nucleus, one electron and one electronic layer, it achieves a whole, which is perfectly functional, being well defined through its physical and chemical characteristics (structural and functional).

In the moment in which the atomic nucleus increases with one proton and the electron layer has two electrons, it is already about another element (helium), which has completely different physic-chemical characteristics.

The number of protons represents the **atomic number** that is the number of order of the elements in the periodic system structure. The atomic number determines the exact position of each chemical element in the periodic system of elements and, thus, in the Big chain of the chemical elements.

If a proton is added to the atomic nucleus and another electron to the electron layer, then the first layer of electrons being complete, a new orbital is formed. The element with three electrons in the atom is lithium, which differs both from hydrogen and helium.

The number of protons and electrons continue to grow in the periodic system of chemical elements to fully occupy a new orbital, forming beryllium, boron, carbon, oxygen and neon, which will have a number of 8 electrons on the second layer.

In the Big chain of chemical elements the difference from one element to another is given by the electron, which is added to the previous element: due to this fact this electron is called **distinctive.**

It is paradoxical the fact that the chemists have used the principle of continuity in the **Big chain of the chemical elements**, but they have gone further and have not mastered the principle of the evolution of chemical elements.

It is clear to everyone that the chemical elements are not spread in space or on the Earth uniformly in the same way it happens with the living beings. With regard to the living beings, we talk about **biodiversity.** It is natural to ask ourselves why the chemists, geologists and mineralogists do not speak about a diversity of the chemical elements in nature, about a **chemodiversity**? It is necessary to talk about the diversity of chemical elements in nature.

Another nodal problem that should be solved by chemists; if the chemical elements known so far can be considered as **chemical species,** with a well-defined status, we must accept that the chemical elements that present a series of isotopes have, in fact, several subspecies.

Such as in biology, in chemistry it should be spoken about the geographical distribution of the chemical elements.

To think that an atom of a chemical element that would be exceeded by the atom of another chemical element, with a higher number of order, would become a kind of waste of nature, it would be an aberration. It is exactly what I was talking in the case of beings: Nature does not make rejects. The mechanisms of performance achieved by man do not become rejects if some parameters are surpassed by other machines. It is said in this case that they have **moral obsolescence.** Such a term should not be used in biology or chemistry or astronomy.

Evolution does not wipe out any traces in this situation.

If the chemical elements known so far and listed in the periodic table of the chemical elements can be considered as chemical species with a well-defined status, we must also take into account the fact that some chemical elements present **isotopes;** they can be considered subspecies.

Isotopes have in their nuclei the same number of protons and electrons, but they differ in the number of neutrons. It is about elements with the same **atomic** number (Z), but with different mass number (A).

In case of chemical elements too, we can speak about an evolution because it takes place a gradual complication of those ones; it is passed through certain stages (links) that differ a little one from another in their linear succession, but there appear differences, differences that increase when the distance between them also increases. We would not speak about the big chain of the chemical elements if there missed some links. The essence of this concept is based on t**he principle of continuity,** of the continuous progress.

We must understand that an extremely important law works in nature, that the evolution does not wipe out the traces, but keep them functional.

The evolution of micro- and macrocosm

In order to be able to follow the evolution of the macrocosm it was necessary to start from the Big Bang. Steven Weinberg realizes an algorithm of the Big Bang and continues with the evolution of the universe until the final time imagining different eras and epochs on the spiral of evolution of the microcosm and macrocosm.

What seems paradoxical is the fact that we cannot follow the evolution of the Universe or of the Cosmos without following the evolution of the micro-cosmos, too, that is of the atom.

Things are so natural connected that you cannot separate them.

The Cosmos had an evolution that cannot be denied and which, at large, began to be deciphered by the human mind.

As we have presented before, the "seed" of the Universe or of the Cosmos does not contain but condensed information; there were neither elementary particles, atoms or molecules, there was nothing of material nature.

From this "nothing" under the form of substance, but rich in information and energy, after The Big Explosion (Big Bang) began the simultaneously building of the microuniverse and macrouniverse (fig. 11).

After 10^{-45}! seconds It started the material existence, time and space:

- The Quarks were combined and formed protons and neutrons;
- The Protons and neutrons were united and formed atomic nuclei;
- The atomic nuclei gained electrons and formed atoms;
- The atoms were associated and formed molecules;
- The molecules were assembled and formed macromolecules;
- The organic macromolecules were assembled and formed cells;
- The Cells were associated, were differentiated morphofunctional and gave rise to living organisms, to unicellular beings, colonial and multicellular (Monera, Protista, Fungi, Plantae and Animalia);
- *Homo sapiens* occurred too and an anthropological evolution took place too.

Evolution in the world of crystals

Following the world of crystals it is impossible not to discover their evolution. As I said, it starts from simple, archetypal forms, which associated and form complex crystals. As a biologist, I see some complex crystals as some colonies from the vegetal or animal world, in which the cells still keep their **individuality. In the more evolved crystals the individuals** begin to form a common body, the whole having priority, similar to multicellular organisms. The most developed complex crystals seem to be a single crystal, but they betray their complexity through the disposition of facets and through cleavage.

The crystals belong to the inanimate world, a stone-still world. We do not think that they give us the beauty of the earth, in its bowels that they have a potential energy that can resonate with the biological energy. Some crystals are used successfully in the treatment of some diseases; it is not about myths. Let’s not forget that in the nucleic acids too crystallize and that they represent the propeller of life that twisting itself in spiral, it generated the spiral of biological evolution.

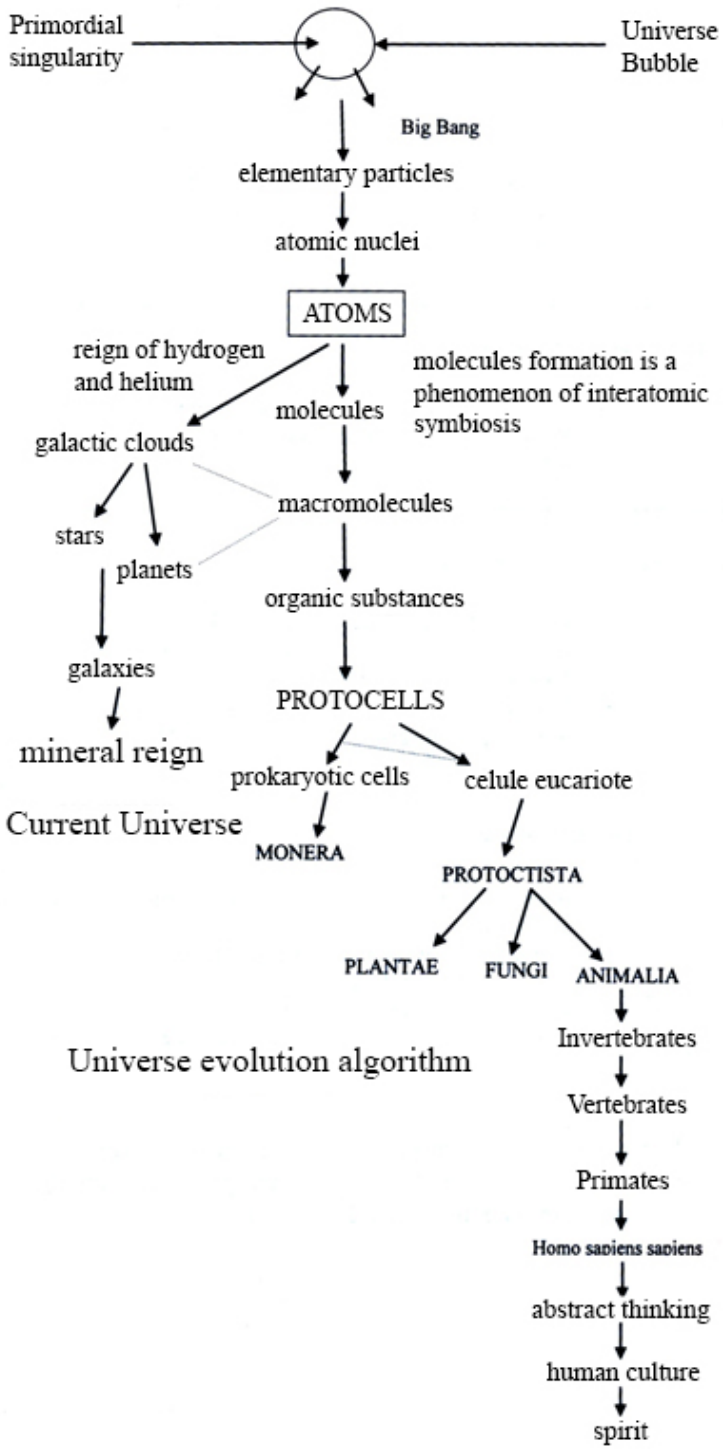


Fig. 11. The Universe evolution

Life has planted itself the roots deeply as far as in the subatomic structures, it selected the necessary chemical elements, it learned the harmony, symmetry and perfection from the crystals and it took over from the three prebiological evolutive levels a multitude of information and patterns, making from evolution a global and unitary phenomenon.

Biological evolution is not above the other evolutive levels and does not function independently.

In the following we will try to demonstrate that between evolutive levels there is a multitude of interactions that make from evolution a global and real phenomenon. Who has knowledge must understand!

Evolution does not wipe out its traces neither on horizontal (on levels) nor on vertical.

Some species of crystals represent true patterns (patents of nature) which are taken over on different levels of evolution. Lima de Faria demonstrates us by certain examples how a pattern from the world of minerals, of crystals, is taken over on other levels, namely in the world of plants and animals (Fig. 12, 13).

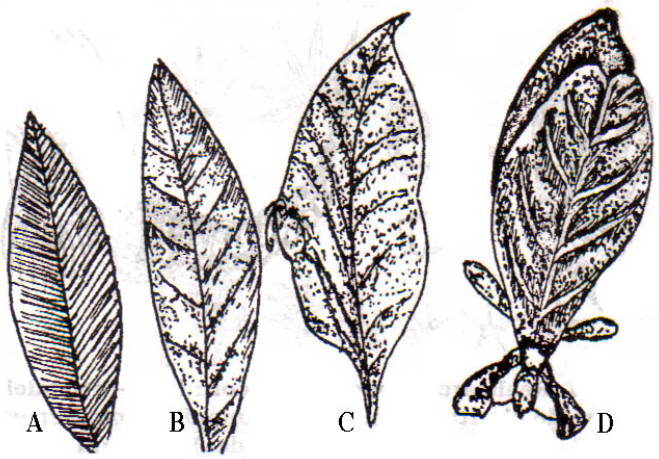


Fig. 12. Patterns taken over on different levels: A. bismuth crystal ; B. leaf; C. Kalima imachis; D. Chitoniscus feedjeanus (according to Lima de Faria)

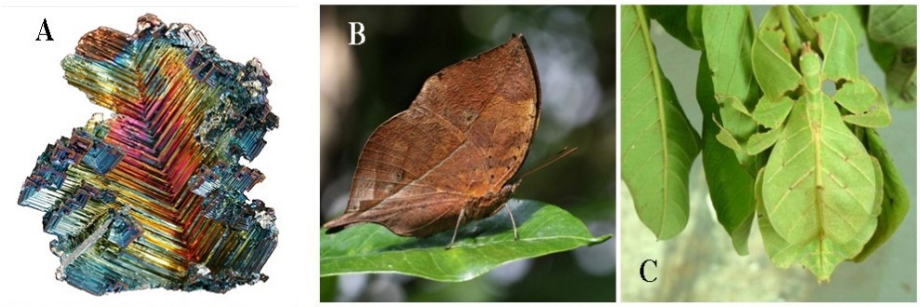


Fig. 13. A. Bismuth crystal ; B. *Kallima imachis*; C. *Chitonicus feedgeanus*

In the native state the bismuth crystal (Fig. 12 A, 13 A) has the aspect of a simple leaf. This model (pattern) seems to be taken over by leaves from the plants, but also by the wings of the butterfly *Kallima imachis* (Fig. 12 C, 13 B), and even by the wings of the phasmid *Chitonicus feedgeanus* (Fig. 12 D, 13 C).

The **s**ymmetry and the form of some crystals that charm you by form and harmony are taken over in the symmetry and the form of some viruses (Fig. 14 B) which will become more dangerous, of some of foraminifera and Radiolaria, of numerous pollen grains from plants (Fig. 14 E) and even in some fruits.

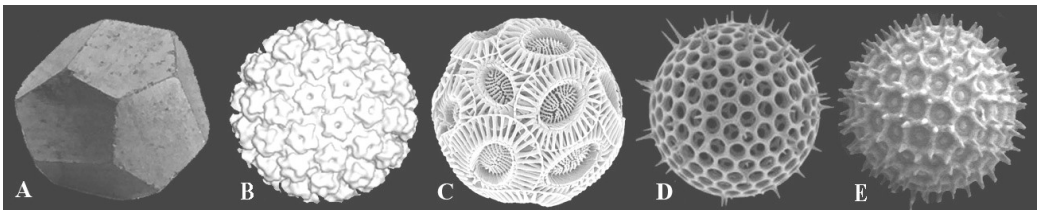


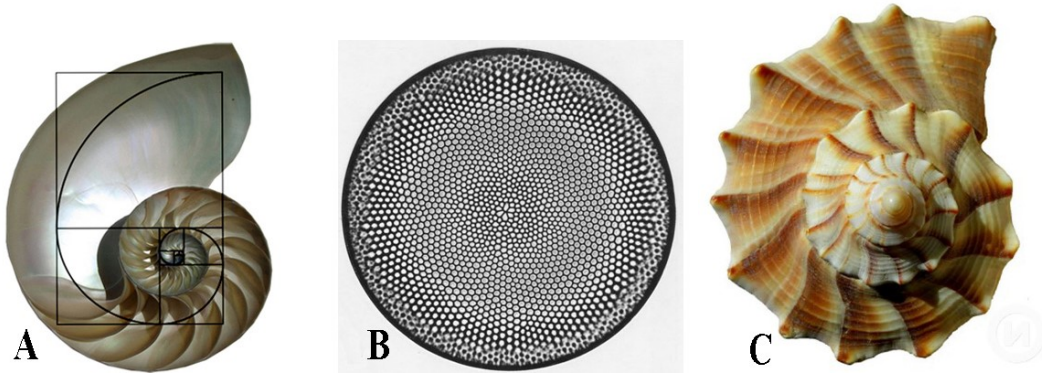
Fig. 14. A. crystal of pirytes; B. Human papilloma virus; C. Emiliania huxley - Cocolitofor; D. Radiolarian; E. Pollen (http://www.mathcurve.com/polyedres/geode/geode.shtml http://pubs.rsc.org/en/content/articlelanding/2011/ce/c0ce00679c#!divAbstract)

Are all these striking similarities simple or simple accidents of nature? was nature forced to discover the "wheel" at the level of each evolutionary level or a patent well done and "verified" functional is taken over on other evolutive levels?

Nature is intelligently structured and a patent once achieved can be used whenever is needed.

As a model of building of some complex crystals, the spiral is met in multiple classes of crystals. But, spiral, either logarithmic or Aristotelian abounds in nature.

Rightly, Mario Livio (2002) states that: "Nature loves logarithmic spirals. From the sunflower, marine shells and eddies, to hurricanes and giant spiral galaxies, it would seem that it has chosen this miraculous form as favourite "ornament" (Fig. 15).



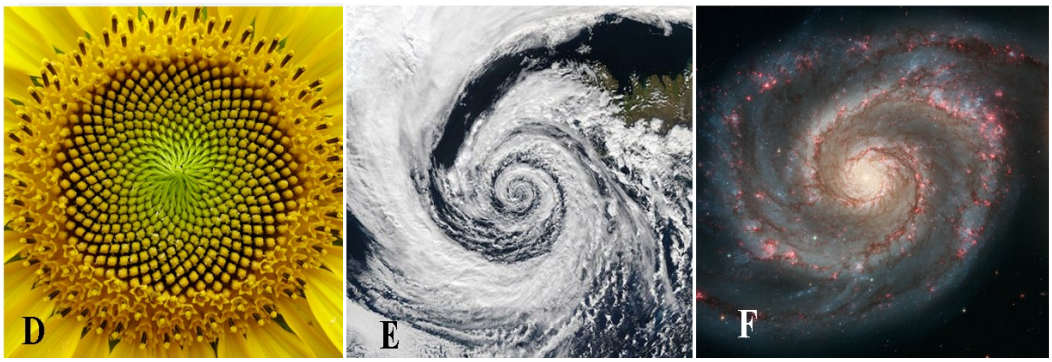


Fig. 15. A.Nautilus shell; B.Coscinodiscus radiatus; C. Marine snail shell D.Sun flower ; E. Storm ; F. Wirlpool Galaxy

The spiral represents the ideal model in the world of crystals, of viruses, of shells of Foraminifera (Fig. 16 A), Radiolaria and molluscs (Fig. 16 B), in the world of plants (Fig. 16 C), in the flight of peregrine falcons (Fig. 16 D) and in the fantastic existence of galaxies.

Fig. 16. A. Dandelion ; B. Marine snail shell; C. Aloe sp.; D. The trajectory of the flight of the peregrine falcon

Nature cannot be overcome regarding the beauty, harmony and exactness. Watch the movement of gyroids and the building of complex crystals. Before returning from your emotions, gaze and follow with how much precision a climbing stem twists around a support (Fig. 17 A), how it seeks the leaves of a branch, or the branches of a twig, the most optimal positions to receive light, air, and moisture without being embarrassed by the others. (Fig. 17. B, C, D).

Fig. 17. A. B. C. D. Examples of phyllotaxy in the vegetal kingdom

Posing for discussion the evolution of the microcosm and macrocosm we have discovered that it starts from the same root and the unique beginning. Thinking in the same way, we realize that we cannot separate trenchantly the atomic universe from that chemical one (when we speak of atoms we must specify the atoms of the chemical elements we speak about). Similarly, we cannot separate trenchantly the universe of the chemical elements from that of crystals one (or the mineral universe).

If we cannot separate perfectly those three prebiotic evolutionary levels and find a series of common elements that make unity between them, we find out that in this way we cannot separate categorically the prebiotic evolutive levels from those biological ones. If we take and examine a diamond it means that we accumulate valuable data regarding the carbon as pure chemical element, atoms of carbon and carbon crystal.

Although viruses are not accepted as living beings due to the inability of self-reproduction we should not be blind and not to see and understand that they have in place all the mechanisms through which to oblige the hosts to reproduce them. If the presence of the nucleic acids as genetic material in the structure of viruses does not seem convincing for some virologists to confer them the status of living beings we cannot put into discussion the fact that in the symmetry of some viruses we find take overs from the symmetry of some crystals (Fig. 18)

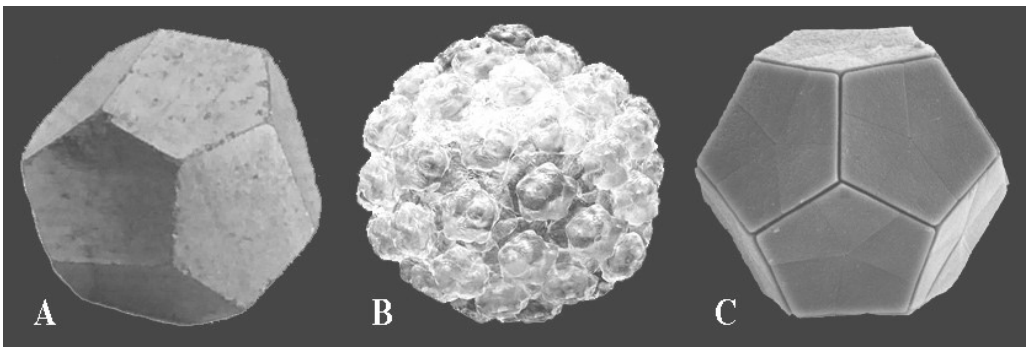


Fig. 18. A. Pyrite crystal; B. Virus, C. Diatoms

We could consider that it would be simple coincidences; however, the fact that such models are abundant in the living world (Foraminifera, Radiolaria, Coccolithophoridae, Diatoms, etc.) demonstrates us that some patents of nature are used as such on different evolutionary levels.

We want to demonstrate that it is not about coincidences, but of taking over of some patterns (biological patents) from one evolutive level to another.

The world of crystals seems to be a stone-still world forever. It is just because we do not see their genesis; we do not see the association of basic units, their spatial display, the twisting of symmetry axes and the translational movements that make possible the emergence of complex crystals. In some magmatic rocks we can observe with the eye of mind the unimaginable dynamics of magma. We can surprise the nascent crystals or in all their glory. Numerous geodes that are formed present a myriad of crystals, from the smallest to the largest ones. Watching carefully these crystals we can surprise a true Darwinian struggle for existence and for the conquest of verticality.

It is sufficient to follow the display of the seeds in a sunflower chapter, in a rosette of achenes of a dandelion and the ornaments on the outer wall of the algae - *Coscinodiscus oculus iridis*, of diatoms to understand what a patent of nature means and its taking over on different evolutionary levels.

I also stated and strengthen our affirmations that crystals represent the apogee of evolution in the inanimate world. We think of complex crystals and quasi-crystals.

Understanding the universe of crystals you immediately realize that you meet together simple and complex crystals (compound). Doing some order for their understanding you realize that you assist to a real evolution of crystals; in each class of crystallization it is started from simple forms to more and more complex ones.

The simple crystals are those primary or archetypal that can be easily recognized. By associating several simple crystals, of the same or different kind, composed, polyhedral crystals are formed. Their complexity depends on the proportion and the number of simple forms that come in combination.

The crystals on the Terra were formed in the ontogenesis and phylogenesis of this planet; those which are found in some meteorites might have certain particular characteristics.

We speak about the ontogenesis and its phylogenesis because it is not just about its birth but also the huge transformations it has undergone over billions of years.

We must also take into account that Terra is not a dead planet. Both in its bowls and its entire structure the planet is full of life, it is in a continuous transformation initiating life and being much influenced by the vital phenomenon.

As in caves, stalactites and stalagmites grow hour by hour, year by year and pass the geological eras constituting a proof of the past time, so in the earth's mantle and boiling magma of the volcanoes there is a permanent transformation of crystals, a real evolution

It seems as heresy to speak about the evolution of crystals, but the eyes of mind and mirror neurons stimulate us to feel the world as far as its limbs, as far as the deep structures of matter.

The transformation of a hexahedron (cube) in a rhomboidal dodecahedron and of this in a deltoidal icositetrahedron can mean the transformation of a crystalline entity into another, consequently, evolution .

If the crystallization systems would represent the phylums of the CRYSTALES kingdom and the crystallographic classes would be classes, or even orders, then, it could outline some phylogenetic trees through which to demonstrate the transformation of some crystalline species in others.

Thus, in the cubic system (cubic phylum) it starts from the archetypal form of a cube, which has six equal square faces (hexahedron). By adding 4 digyres (rotations) in the direction of the diagonal of the cube, there are obtained those 5 classes of the cubic system; the axial cross of the cubic system is given by three axes of equal size, enclosing an angle of 90° C (Imreh, 1966, p. 84).

Starting from the hexahedron, with six equal square faces, one can get the rhomboidal dodecahedron with 12 faces and hence one can form a crystal with 24 triangular faces – tetrakis hexahedron. We find out a spectacular evolution in the transition from an octahedron with eight triangular faces to tetrakis hexahedron with 24 triangular faces. We surprise in these cases an impressive increase of complexity of crystals; it is what we call evolutive progress.

It would be no surprise or anomaly to find out that an anomaly or a polyhedral complex crystal might derive from a more complex crystal by simplifying its structure. Moreover, Stoicovici, 1974 (quoted by B. Onac, 2001) is of opinion that the crystal of pentagonal dodecahedron type would derive from a more complex crystal – tetrakis hexahedron through alternative development and elimination of some of its faces (B. Onac, 2001, p. 106).

We can outline such phylogenetic trees in all the crystallographic systems and in every class (Fig. 19). All the forms are found in nature; evolution does not wipe out its traces, but keeps them functional. It remains only for us to discover them, to understand them and to put them in their place; It is about crystals in the big chain of crystals, if such a chain could be imagined some time.

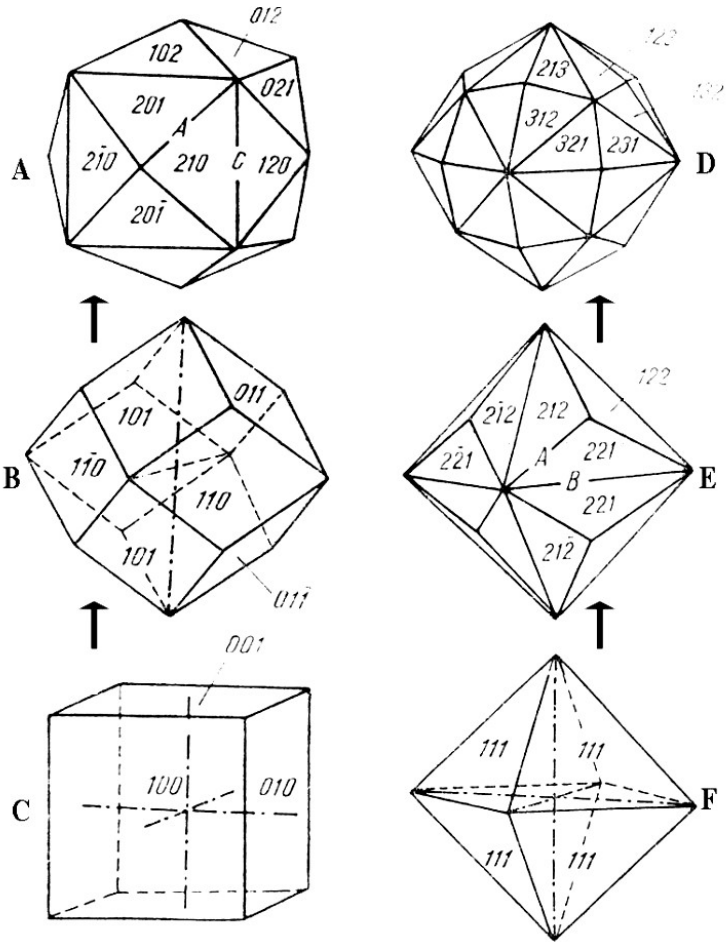


Fig. 19. Evolutive directions of some crystals in the cubic system: A. Tetrakis hexahedron; B. Rhomboidal dodecahedron; C. Hexahedron ; D. Hexakis octahedron; E. Triakis octahedron ; F. octahedron (according to Imreh, 1966)

Conclusions

Following the evolution as a cosmic phenomenon, we find out that it is characteristic both for the microcosm and for the macrocosm (what is natural because these formations start from the same root) and that they generate both the material world and the spiritual one.

No matter the level at which the evolution works, this ensures the **general progress**. The progress realized on the spiral of evolution does not cancel either of the earned accumulations in the successive stages through which it passed; nature does not create rejects and does not wipe out its traces.

In nature, the whole forms a fundamental unit, everything depends on everything. A genealogical tree (phylogenetic) cannot be considered but in its structural and functional totality, as the living tree could not function but in its integrity. Flowers, fruits and seeds could not exist without the structural and functional continuity of the whole plant.

If the evolution is a cosmic reality, then the law according to which the evolution does not lose its traces, but it keeps them functional, is a universal law too.

References

[1] Barnes R. D., 1963, *Invertebrates Zoology*, Saunders Philadelphia.
[2] Constantineanu Mihai, 1957, *Curs de Zoologia nevertebratelor*, vol. III, Întreprinderea Poligrafică, Iaşi.
[3] Ghişa E., 1964, *Botanică sistematică*, Edit. Did. Şi Ped., Bucureşti.
[4] Giesberg H., Rutschel P., 1968, *Vergleichende Anatomie der Wirbeltiere*, Ed. Gustav Fischer, Jena.
[5] Kaestner A., 1963 – 1965, *Lerbuch der Speziellen zoologie*, Ed. Gustav Fisher, Jena.
[6] Lima de Faria Antonio, 1988, *Evolution without Selection*, Elsevier, New York.
[7] Mario Livio, *Secţiunea de Aur*, 2002, p. 233
[8] Lang A., 1889, *Traite`d`Anatomie compareé et de Zoologie*, Paris.
[9] Mustaţă Gh., Mustaţă Mariana, 2001, *Origine, evoluţie şi evoluţionism*, Ed. V. Goldiş University Press, Arad.
[10] Mustaţă Gh., 2009, *Evoluţia prin asociere şi edificarea organismelor*, Ed. Vremea, Bucureşti.
[11] Mustaţă Gh., 2011, *Pe urmele evoluţiei*, Ed. AOSR, Bucureşti.
[12] Natali V. F., 1951, *Zoologia nevertebratelor*, Ed. Agro-Silvică de Stat, Bucureşti.
[13] Onac P. Bogdan, 2001, *Principii de cristalografie*, Presa Universitară Clejeană.
[14] Petreuş Ion, 1987, *Cristalografie. Cristalografie morfologică şi structurală*, Institutul Politehnic Iaşi.
[15] Racoviţă E., 1929, *Evoluţia şi problemele ei*, Ed. Astra, Cluj.
[16] Radu V. Gh., Radu V., 1967, *Zoologia nevertebratelor*, Edit. Did. Şi Ped., Bucureşti.
[17] Severtsov A.N., 1948, The origin and evolution of lower vertebrates, Moscova.
[18] Slobodkin L. B.,1964, *The Strategy of Evolution*, Amer. Scientist, 52, 342 – 357.
[19] Zavadski K. M., Kalcinski E. I., 1997, *Evoluţia evoluţiei*, Nauka, Leningrad.