

## Seismology in the Light of Fundamental Sciences

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### Abstract

According to the definition, seismology is a science that studies the processes and causes of seismic phenomena and the structure of the Earth, i.e. a scientific discipline that studies the movement of blocks of rocks of the Earth's crust and mantle and related phenomena. Seismology conducts research in the following areas and is designed to scientifically explain two main issues:

1. Study of the nature of seismic phenomena and the internal structure of the Earth. Why, how and where do seismic impacts occur?
2. Protecting humanity from the catastrophic consequences of seismic events. Is it possible to predict seismic impacts?

Like any other scientific discipline, seismology is obliged to follow the laws of science and its fundamental principles. This article is devoted to the description of violations of the fundamental laws of science committed by seismologists in the study of seismic processes and raises the question of compliance of the stated research directions with the current level of development of sciences. Answering point No. 1, regarding the structure of the Earth, it is possible to recognize some successes of seismology, which nevertheless cause great doubts of the scientific community of geophysicists, because if the stratigraphic data of ultra-deep wells often refute [1] the conclusions made by seismologists on the structure of the Earth's crust at shallow depth, then to assert something unambiguously about the structure of the mantle and at the present stage, seismology cannot. Answering the main questions of seismology, *why* seismic phenomena occur, and *how* earthquake energy is formed, seismologists have not had, and have not. Answering point No. 2, we can confidently say that in the matter of forecasting seismic phenomena, seismology has not advanced one iota over the past century, and as seismologists have been confused in the search for earthquake prediction algorithms, they are also confused without any hope of success. All that modern seismology can "boast" is the theory of Elastic recoil [2], the absurdity of which does not cause any doubt among the progressive part of geophysicists. But, the fact that most of the leading scientists-seismologists continue to piously believe the conclusions of the Elastic Recoil theory puts seismology in a humiliating position, because Mr. Reid's theory is the clearest example of a false theory based on scientific incompetence of scientists, a model of brazen violation of the fundamental laws of science and the foundation of false and ignorant conclusions. Based on the results achieved, or rather on their absence, we regret to draw a sad conclusion: modern seismology is in the deepest decline, the cause of which is the incompetence of researchers as a result of their catastrophically low level of academic training, who stuff the scientific community with scientific geophysical rubbish, breeding similar ignoramuses in seismology. We understand that by asserting this, we offend most seismologists, but it is impossible to continue to tolerate this state of affairs in geophysics, because: "*Amicus plato, sed magis amica est veritas.*" Obviously, the time has come for a new meteorologist, Alfred Wagener [3], who will come and teach seismologists not to guess on coffee grounds, but to investigate seismic processes using the fundamental laws of science. In this article, we not only investigate the reasons for the unsatisfactory state of affairs in seismology, but also give our answers to the questions - *why* earthquakes occur and *how* seismic energy is formed.

**Keywords:** seismology, earthquake, fundamental laws of science.

## **1. Introduction**

According to the definition, seismology is a science that studies the processes and causes of seismic phenomena, i.e. a scientific discipline that studies the movement of blocks of rocks of the Earth's crust and mantle and related seismic phenomena and is designed to scientifically explain why, how and where earthquakes occur, sudden rock ejections, mountain impacts, catastrophic landslides and other phenomena related to movement of blocks of rocks. Answering the main questions of seismology why seismic phenomena occur and how earthquake energy is formed, all that modern seismology can "boast" of is the theory of Elastic recoil and its numerous clones, the absurdity of which does not cause any doubt among the progressive part of geophysicists. At the beginning of the 20th century, when geophysics was stalling and mired in the mud of false theories, meteorologist Wegener appeared who wiped the nose of all geophysicists of the world and showed the direction in which they should move. But as soon as geophysicists began to get out of a dead end, they got into an equally deaf, scientific dead end called the theory of Elastic recoil. From that moment on, seismologists, like the king of Coinfus, Mr. Sisyphus, roll the "stone of science" to the unattainable peak of seismology and wander between the three pines of the theory of accumulation of elastic deformation energy by a rock mass imposed by Mr. Reid. A hundred years have passed since the proclamation of the Elastic Recoil theory, but most leading seismologists continue to faithfully believe the theoretical calculations of Mr. Reid, which puts seismology in a humiliating position, because this theory is the clearest example of a false theory based on scientific incompetence of scientists, a model of brazen violation of the fundamental laws of science and the foundation of false and ignorant conclusions. Based on the lack of results in seismological research, we regret to conclude that seismology is in the deepest decline, the cause of which is the incompetence of researchers as a result of their catastrophically low level of academic training, who stuff the scientific community with scientific geophysical rubbish, breeding similar ignoramuses in seismology. It became quite obvious that modern seismology, in view of the powerful scientific inertia in its environment and the worship of false authorities of geophysics, is not able to nurture major researchers of seismic processes and the time has come for the emergence of a new meteorologist Alfred Wegener, or biologist Charles Darwin, or agronomist Franz Achard, or metallurgist Andrew Forrest, or great representatives of other scientific disciplines who will come and teach seismologists not to guess on coffee grounds what they are doing at the moment, but to explore seismic processes using the fundamental laws of science, for, like any other scientific discipline, seismology is obliged to follow the laws of science and its fundamental principles. It is obvious that Reid's theory has generated a huge inertia of thinking in the geophysical community fixated on elastic deformations and this "scientific" inertia aggressively nips in the bud any alternative hypotheses. In such a toxic scientific environment, there is no generation of new ideas. A dead end! Isn't that why any small-scale question from the field of seismology (for example, the question of earthquake prediction) hangs helplessly in the air? At the same time, some scientists sigh sadly, sprinkle ashes on their heads, fatefully throw up their hands, and shyly look away, while others cheerfully promise an early victory in earthquake forecasting, shamelessly putting their hand into the purse of tax payers... It may be objected to us that this is not the case, and in addition to Elastic Recoil, scientists have developed several other hypotheses explaining the process of occurrence and occurrence of an earthquake. Unfortunately, this will be a clumsy attempt to mislead society, because all these so-called new hypotheses use the same brick in the foundation laid by Mr. Reid in his Elastic recoil, namely the mystical and long-term accumulation of elastic energy as a result of deformation forces in the mountain range. There is a strong impression that geophysicists have fallen into "elastic hypnosis" and do not understand that with the development of alternative directions for searching for earthquake energy, Mr. Reid's theory would no longer be a geophysical pseudo-puzzle closed on the forces of elastic deformations of rocks of a mountain range with an unknown and mysterious source of excitation, but part of new scientific ideas for the study of complex and a formidable process, intensively affecting the weakened zones of the Earth's crust by shock waves along the faults and boundaries of tectonic

plates and blocks. Most seismologists cannot figure out in any way that nature acts extremely simply on the principle that where it is thin, it breaks! This has been confirmed thousands of times by Ohm's law: - rivers, instead of flowing straight across the earth's surface, bend and loop in a strange way precisely because they flow along a fault, washing out their channel in a softer, weakened soil formed as a result of plastic deformation of rocks. Just like lightning in a stormy sky, it looks for areas of the atmosphere with the least resistance for its path and therefore writes funny pretzels with an unpredictable trajectory, similar to an electric circuit - when some part of the circuit has low resistance; it turns into an excellent conductor of energy! Moreover, what is especially important for understanding the geophysical processes in the bowels of the planet and this will be confirmed by any novice electrician - **a section of the circuit with low resistance does not accumulate, but only conducts energy!** Therefore, by analogy, it can be concluded that nature uses areas and blocks of rocks with low resistance (stiffness) to deformation to pump (dump) "extra" energy from the action of external forces. But, as we have already noted, seismologists seem to be blinded and do not want to see this. They cannot understand that nature is not just pushing, but pushing them with all its might to realize the simple fact that the earthquake process develops in accordance with a well-known physical postulate - **any movement of any matter occurs along the path of least resistance with maximum work and minimum cost.** There is no other way, at least on our planet, physical processes and chemical reactions can go, and whoever claims the opposite, to put it mildly, misleads us and tries to pass off pseudo knowledge as the truth! It is forgivable to Mr. Reid that he mistakenly interpreted the movement of tectonic plates along the San Andreas fault in 1906 as the source of the earthquake that destroyed the city of San Francisco, because the level of knowledge of that time did not allow him to find a correct explanation of the process, but this is completely inexcusable for modern seismologists, who still have not understood that In the San Andreas fault, it turned out to be a natural tool, a kind of lightning rod and the path of least resistance for the passage of an energy pulse in the bowels of the Earth, and the city of San Francisco accidentally fell into the eruption zone of the internal energy of the bowels of the planet. To put it even more simply, it was not the displacement of rocks along the fault (consequence) that caused a catastrophic earthquake, but on the contrary, the earthquake (cause) caused the plates to move relative to each other. In such a natural way, nature, in accordance with the postulate of the Minimum Energy of any system, has leveled the energy imbalance that arose as a result of various physico-chemical processes in the bowels of the Earth. This article is devoted to the description of violations of the fundamental laws of science committed by seismologists in the study of seismic processes and raises the question of compliance of the stated research direction with the current level of development of sciences.

## 2. **The theoretical part**

Considering modern seismology, we do not cease to be surprised by the large number of contradictions to the fundamental laws of science that this discipline contains in explaining seismic phenomena. There is a firm belief that reading the scientific tall tales of famous seismologists, we get into the Middle Ages, when the fundamental laws of nature were not yet known. Seismologists all over the world, as if enchanted by the theory of Elastic recoil, tell us about the fantastic ability of rocks of the rock massif to accumulate the energy of elastic deformations, which, according to them, is the driving force of any seismic event. Seismologists seem to have never heard of the fundamental principle of the Minimum energy of any system [4], which strictly prohibits physical bodies from accumulating elastic energy of deformations. Seismologists have heard about the law of conservation of energy out of the corner of their ears, but there is no principle of minimum energy! But this is the same fundamental law of nature as the law of conservation of energy, which cannot be ignored by all scientists, not only on our planet, but throughout the universe. But seismologists do not think about the obvious fact that if a mountain massif could somehow fantastically accumulate energy in its body, then over time, from the action of the forces of lunar and solar tides, for example, every day, the rocks of the

Earth's crust would accumulate so much energy that it would be more than enough it was enough to easily split our globe like an ordinary walnut. And our "ball" already 4 billion years, in spite of all seismologists of the world, unharmed. But seismologists think about this fact, which is obvious even to schoolchildren, and reason along the following lines: "Well, our planet is intact and thank God," they say, "and why it is not torn to pieces by the energy of tides and how this is consistent with the principle of minimum energy, we are absolutely not interested. This example alone with tidal forces suggests that it would be useful for seismologists to know the laws of physics and understand the laws of the transition of one type of energy into another and have clear concepts borrowed from thermodynamics: thermodynamic systems, thermodynamic equilibrium, thermodynamic processes related to temperature, heat, thermodynamic work, internal energy, entropy, etc. [5]. Seismologists, studying earthquake processes, are simply obliged to know the fundamental foundations of science, but, as it turns out, they do not know, and as a result of their ignorance, they repeat Mr. Reid's nonsense for us over and over again:

"An earthquake occurs when tectonic plates slide relative to each other or along a fault, the movement of which is hindered by the force of friction. As a result, energy accumulates in rocks in the form of elastic stresses. When the stress reaches the critical point of the ultimate strength of the rocks, there is a sharp rupture of the rocks with their mutual displacement in the form of an earthquake."

That is, just like a hundred years ago, seismologists sincerely believe and try to convince the whole scientific world that rock blocks absorb the energy of elastic deformations every minute, joule by joule, like giant accumulators or porous sponges the size of continents, in order to splash this energy on our heads one day. At the same time, no seismologist in the world has determined the amount of elastic energy that an elementary block of rocks can accumulate (absorb). How so, seismologists in chorus and as if under a carbon copy repeat about the existence of huge reserves of elastic energy in the rocks of the earth's crust, but no one can even say approximately how much energy an elementary block of rock can accumulate in an hour, a day, a month, a year, a century... Can you imagine what a huge field for fantasies opens up for seismologists? Each of them can declare to us absolutely any number from zero (0) to infinity ( $\infty$ ) and no one can adequately object to him, because there is no formula for calculating the elastic energy of deformation of rocks contained in the elementary volume of the rock massif. And this situation is very convenient for seismologists, right according to the proverb: - you can talk until you're blue in the ..., - because no matter what figure we were announced, no one will be able to check anyway. Nobody. Agree, it is very strange that if today we can easily calculate the energy of any physical, chemical, mechanical and even biological event, for example, the energy of the flight of a hungry mosquito, then why can't we calculate the elastic energy of an elementary block of rocks? Kindly, gentlemen: the mass of a hungry mosquito is  $\sim 2$  mg. ( $m = 2 \cdot 10^{-6}$  kg.). A hungry mosquito (it is hungry, because a well-fed mosquito becomes sleepy and lazy and, accordingly, flies slower) is able to develop a cruising speed of  $V_m \sim 3$  km / h or  $\approx 0.83$  m / s. In this case, the kinetic energy of a hungry mosquito will be  $E_k = m \cdot Vc^2/2 \approx 2 \cdot 10^{-6} \cdot 0,83^2/2$  or  $\approx 0.7 \cdot 10^{-6}$ J. If we have easily determined the flight energy of a hungry mosquito and can easily find (and this is no joke) the snoring energy of a well-fed medium-sized hippopotamus ( $\sim 3000$ kg.) capable of making sounds with a volume of  $\sim 90$  decibels and sleeping on the shallows of the Congo River in cloudy weather (the speed of sound propagation depends on the humidity of the air), then why none a seismologist, a geophysicist, a physicist, a chemist, a mathematical genius and all the Nobel laureates taken together cannot derive a formula for determining the amount of elastic energy that an elementary block of rocks of a mountain massif contains at a depth of 10 km. under the Mount Fuji volcano and calculate what energy this block will have in a year, in ten years, in a century? It turns out that the most important question of any seismic event – the source of its energy supply is hidden by a thick fog of scientific uncertainty, and all the talk about the energy of elastic deformations of rocks in existence are empty rants?

Therefore, this means that when seismologists wander in their articles and dissertations about the energy of earthquakes, they are just guessing on coffee grounds or voicing figures taken from the ceiling of their office. And the solution to the great mystery of the energy source of seismic events is explained quite simply and banally by the fact that rock blocks do not have the ability to accumulate elastic energy in serious quantities. After all, this is what the principle of Minimum energy postulates, to which the admirers of the Elastic Recoil theory are so dismissive. Surprisingly, we live in the 21st century, and modern seismologists seriously think that a physical body can exist with an excess of energy, accumulating it hour after hour and day after day as a result of deformation processes in order to burst out with the release of accumulated energy. Let's imagine a rock massif in the form of a beach. No matter how many hours the Sun gives energy to the sand grains of the beach during the day, there is a limit to the temperature to which the sand will heat up. Yes, you can somehow fry a chicken egg on the Sun-baked sand, but no matter how much the Sun scorches the beach, you will never be able to boil water. All the electron volts, calories, and joules that the beach will receive in excess of its minimum limit will be quickly and unambiguously disposed of. This is the principle of the Minimum energy of the system, which for all physical bodies will depend on the environment. If a cloud runs into the sky, the sand will cool down, because the ambient temperature has changed, which means that the limit of the minimum energy of sand will change. Night will come and the sand of the beach will give away all the energy that it acquired during the day, regaining the minimum of energy that it possessed before sunrise. But no matter how much the Sun "roasts" the beach during the day, no matter how much energy it gives it, the sand will in no way accumulate the energy transmitted to it by the Sun, but will steadfastly keep its Minimum energy, otherwise by the end of daylight the grains of sand will begin to melt from the energy accumulated during the day. This fundamental principle concerns not only the grains of sand on the beach, but all physical bodies on Earth, including tectonic plates and no matter how much the universe, the Sun, the internal "motor generator" of the planet Earth, the heat of nuclear reactions in the body of the planet, etc. they did not communicate energy to the rocks of tectonic plates and blocks, no matter how much the rocks received energy from their own movement of plates by mantle flows, they, through metamorphism and tectonogenesis processes, will immediately utilize the energy received from the outside, otherwise for 4 billion years of "putting energy into a piggy bank" all the rocks would have melted long ago, turned into magma and drowned the planet in boiling hell. We agree that over time, some changes in the conditions of rocks in nature may change and this will be reflected in the minimum energy limit that a rock can have. For example: the approach of magma to the day surface of the earth's crust and the increase in ambient temperature and pressure in the depths of the rock massif. But these changes in the conditions of rock residence will be of a strictly limited scale, which will not significantly affect the overall energy state of the area, and the fundamental principle of Saint-Venant [6] serves as a scale limiter and has no less significant influence on seismic processes than the principle of Minimum energy and which, unfortunately, is also not taken seriously seismologists or they just don't know about its existence. It is obvious that with the maximum strength of rocks equal to  $\sim 400$  MPa ( $\sim 100$  MPa -  $150$  MPa, taking into account cracks, inclusions, dislocations), the rock mass is physically unable to accumulate and allocate the energy level necessary for an earthquake through elastic deformations, because such pressures do not exist in the bulk of the rocks of the earth's crust and mantle. - Let me correct you, - seismologists will object to us, - it is well known that diamonds are formed in the earth's crust at a pressure from  $\sim 4500$  MPa to  $\sim 6000$  MPa. Agreed, gentlemen, your truth and this pressure is much higher than the strength limit of any of the strongest rocks (compare:  $100$ - $150$  MPa  $\leq$   $4500$  MPa -  $6000$  MPa). But why, with more than ten times the strength of the rocks of the Earth's crust at the pressure of the birth of diamonds, they do not break down into constituent molecules and huge tectonic plates do not represent a "stuffing" of small fractions of milled rocks? The fact of the virgin state of 90% of rocks in the depths of the planet leads us to believe that the volume pressure of rocks at any depth of the Earth is balanced, i.e. the pressure gradient at any depth is close to zero. And only in strictly

limited areas of faults, cracks, caverns, wells and other mining and geological disturbances, a pressure gradient appears in the rock mass, which leads to the inevitable formation of a charge and the inevitable occurrence of an electromagnetic field [7], which are the energy sources of any seismic event (that is why seismic phenomena occur mainly in areas of disturbances, subduction and abduction zones, etc.). And the size of the area of the elementary volume of rocks where the pressure difference occurs is limited by the Saint-Venant principle, which means it is this fundamental principle that determines and doses the amount of energy generated by the mountain massif of a future seismic event. But this is not the end of our story, and at this point it is necessary to remind respected seismologists about the next fundamental principle of Le Chatelier—Brown [8], which will come into its own as soon as not only the pressure in the rock massif changes, but also any equilibrium condition: temperature, concentration, induction, external electromagnetic field, etc. It is obvious that modern seismologists have heard (or not heard?) about the fundamental principle of Le Chatelier — Brown, but they did not bother to try it on to seismic processes, and it is he who opens the door to the process of earthquake energy formation, forming a charge in a rock massif so necessary for the emergence of an electromagnetic field.

It was the vast gaps in knowledge of the fundamental principles of the minimum energy of any system, the Saint-Venant principle, and the Le Chatelier–Brown principle that served as a trap for seismologists. But this is not all the “scientific sins” of seismologists and below we will list a few more fundamental principles that seismologists do not want to notice, but for now we want to draw attention to the fact that all fundamental principles are strictly interrelated, complement each other and form a whole and the slightest violation of any of them leads to a perverted understanding of the nature of the process and the appearance of false knowledge, as happened with the theory of Elastic recoil. Obviously, if a seismologist “floats” in understanding the fundamental principles of science, then one should not expect results from his scientific activity, because all he is capable of in this case is pseudoscientific conclusions. And it doesn't matter who he is: a student, a graduate student, and a professor of sciences or an academician.

At the moment, there is a situation in seismology where seismologists are no longer able to promote science, because they do not even know approximately the amount of energy circulating in rock massifs, its sources, scientific principles of education and mechanisms for its implementation. That is, the cornerstones of seismology, as a science, have not yet been determined. How did such a situation become possible in seismology? We think that seismology is not a science that could be taken offhand. With all due respect to other sciences, seismology is not physics and mathematics, it is not chemistry and geography, it is not quantum mechanics and applied sciences such as mechanical engineering, civil engineering, agronomy and astronautics. Seismology is much more than each of the listed disciplines. In order to evaluate the trajectories of the movement of tectonic plates and to understand the huge influence on these movements of the properties of the rocks composing tectonic plates, a seismologist needs to know the structure of the planet, and therefore be a competent geologist. Speaking about the properties of rocks in a broad sense of this issue, it is necessary to thoroughly know physics and chemistry, because the carriers of the energy of rocks are electrons and electromagnetic fields. Not knowing the structure of the atom, chemical reactions and bonds, the dynamics of defect motion, the postulates of N.Bohr [9], the theory of self-induction by Henry Joseph [10], the theory of chain reactions by N. Semenov and S.Hinshelwood [11], the theory of magnetic effects by L. Buchachenko [12], as well as the works of other geniuses of physics and chemistry, it is impossible to be a seismologist! This means that a seismologist needs very solid knowledge of physics and chemistry in addition to knowledge of geology. Speaking about the energy of a rock massif and the energy of earthquakes, a seismologist needs, like Our Father, to know the laws of thermodynamics. Plus, seismology is closely intertwined with volcanology, and since there are many fluids in the earth's crust and mantle in the form of gases, liquids and magma, which directly, and possibly to a decisive extent, affect seismic processes, a seismologist needs to know

hydrodynamics and understand the processes and laws of movement of magma and other fluids through underground channels and hydraulic and cavitation shocks and other hydrodynamic phenomena associated with this movement [13]. Plus, in order to understand the processes leading to the destruction of rocks and the formation of faults, shifts, synclines and other geological disturbances in the Earth's crust, a seismologist needs to know mining and the mechanics of rock destruction, both by explosive means and with the help of mining machines, and be sure to go down into several deep mines to see and “feel” the underside our planet. That is, a seismologist needs knowledge of mining engineering. Plus, in order to understand the deformation processes of tectonic plates and rock blocks and clearly imagine the vectors and magnitudes of emerging forces and loads, it is necessary to understand well and confidently know the theoretical mechanics and methods of calculating loads and be familiar with mathematics, otherwise seismologists tomorrow and after tomorrow will convince us that tectonic plates are contracting under the influence of loads and thereby generate and accumulate elastic energy, not paying attention to the fact that at this moment another fundamental principle from the field of theoretical mechanics comes into action, which is brighter than the sun highlights this next stupidity of modern seismology: “...When the stress reaches the critical point of the ultimate strength of the rocks, there is a sharp rupture of the rocks with their mutual displacement in the form of an earthquake.” As we can see, the Elastic Recoil theory got its name from the supposed sudden mutual displacement of rock blocks (elastic rebound, recoil). That's what Mr. Reid thought, and that's what most modern seismologists think. But, unfortunately, they do not know the well-known fundamental principle of mechanics, which puts a fat cross on their fantasies: “If the length of the body refers to a thickness of more than 3:1, then it is impossible to compress this body” [14] and instead of compression, the body will bend, which completely eliminates the possibility of an illusory rebound invented by Mr. Reid. If we take any tectonic plate, then the ratio of its length to thickness will be much greater than 3:1, therefore, no elastic rebound in the collision of plates will work under any conditions. But that's not all, to compress the sample, its surfaces must be strictly parallel to the base of the press and the punch, plus, the sample must be strictly homogeneous. Simply put, when tectonic plates collide (contract), their contacting ends will be uneven surfaces divided into countless sections with different modules, and randomly directed vectors of elastic deformation forces and which, for the most part, will compensate each other. At the same time, it should be emphasized that the rocks of the earth's crust are always anisotropic and contain a great many pores, fluids, cracks, faults dividing tectonic plates into separate blocks, strata, sections, which significantly enhances the effect of crushing and relaxation of deformation forces. Equally important are the differences in chemical composition, physical, mechanical and temperature parameters, and the probability of finding a homogeneous tectonic plate according to these parameters is 0%. Can we say that tectonic plates and blocks have the same temperature in their entire volume from the surface to the mantle, and the planes of application of tectonic plates are strictly parallel? No, we can't. Do tectonic plates have the same physical and chemical properties throughout their strike and thickness? No, they don't. How can we believe that the plates do not have cracks, fractures, voids filled with fluids? No. So what kind of elastic stresses accumulating in the rocks of the crust and mantle do we have the right to talk about? Naturally, no one denies that nature constantly compresses plates and blocks, and this conclusion is well confirmed by geological manifestations: folds of layers, synclines, anticlines, hill formation, heaving of rocks in mines, swelling of volcanic cones, etc., but this process is so chaotic in the angles of meetings and directions of plate movement that we have no right to talk about a single compression force. Seismologists are either blind, or for some unknown reason they do not want to notice that the theory of Elastic recoil has a false foundation, which is based on the ignorance of the people who put it forward and the people who accepted this false idea. They do not notice the simple and continue and continue to compress tectonic plates in their articles, not a bit embarrassed by their ignorance... But even this is not the final verdict of modern seismology, now it is necessary to say about such an important parameter determining the elastic forces in deformable rocks - the

loading time of the sample, because this parameter has not just a significant, but a gigantic influence on the manifestation of the properties of elasticity, plasticity and brittleness. Time itself is not a fundamental law, but since the states of our entire world depend on time, the state of any system also depends on time. Time is a form of processes, and it is very strange that seismologists have not yet paid serious attention to the importance of time in the processes of formation of elastic energy of deformation of rocks and the course of seismic processes. It is known that at a high loading rate, the property of brittleness is sharply manifested, and at a slow one, the property of plasticity. And the speed of any processes on Earth, including the speed of all phases of seismic processes, is time. For example, brittle glass is capable of showing fluidity even at room temperature during prolonged exposure to load, and rocks - creep. Recall an example from the physics of creep of materials, when the glass that had stood for several centuries in the windows of old houses thickened at the base due to fluidity. And this is at normal temperatures and in just a few hundred years! Creep is inherent in all solids, both crystalline and amorphous, subjected to any kind of loading and possibly at different temperatures. From this it can be concluded that under prolonged loads with time periods of tens, hundreds and thousands of years and when exposed to high temperatures of the Earth's crust and mantle, brittle rocks of tectonic plates will exhibit not elastic properties, but creep properties, Fig. 1, that is, elastic deformations of rocks will smoothly turn into plastic, and over time will only increase, up to the plastic flow. That is, again in comparison with Mr. Reid: "...When the stress reaches the critical point of the ultimate strength of rocks, there is a sharp rupture of rocks with their mutual displacement in the form of an earthquake"- **no reaching the point of ultimate strength of rocks, and therefore no sharp rupture of rocks in the mountain range will occur.**



Fig.1 Plastic deformation of rocks of the rock massif

Concluding the topic of elastic energy accumulation in rocks of the rock massif, we would like to note the fact that many geophysicists persistently exaggerate the idea of finding a huge amount of stored energy in rock blocks. These are the so-called built-in stresses, for example, during the formation of various kinds of dislocations during geological processes in a rock massif, in concrete or tempered metal, glass. We are quite well aware of the increased strength of hardened machine parts and that magmatic and other processes in the earth's crust are akin to heat treatment of metals and concentrations of embedded stresses are possible in some places of tectonic plates, but we should upset such dreamers. Yes, we agree, embedded stresses are



sometimes present in rock massifs at shallow depths. But one of the physical features of such stresses is that at elevated temperatures such built-in stresses evaporate, and if we consider that earthquake epicenters are located at great depths where solid temperatures exist, and then there are simply no built-in stresses and other dislocations there. Let me give you a simple and illustrative example: if you take a hardened dagger and heat it (heat treatment by annealing), then the steel of the dagger will become soft and plastic, because all the built-in stresses, as metallurgists say, will evaporate.

### 3. Discussion on the first part of the article

This discussion relates to the first question voiced by us in the abstract: The study of the nature of seismic phenomena: why, how and where do they occur? We are not the first to draw attention to the discrepancy between the Elastic Recoil theory and the fundamental laws of physics. Many well-known seismologists have written about this. Here are the words of the famous Russian seismologist G.P. Gorshkov from his monograph: - "The presence of a widespread, but unfounded hypothesis of Elastic recoil, which underlies many modern research in the field of seismology, slows down work, leads it towards false paths and does not and cannot lead to positive results" [15]. Another well-known seismologist Rebetsky Y.L. is no less categorical: "The negative result in the forecast problem shows that our ideas about the mechanism of earthquake generation are quite far from the real natural process. Many ideas about the earthquake preparation process have migrated from the mechanics of the strength of structural materials, and do not take into account the structural features of seismogenic sections of the earth's crust - fault zones" [16].

As we can see, progressive seismologists put the scientific groundlessness and pseudoscience of his brainchild as the main reproach to Mr. Reid. But supporters of the Raid are not confused by the strange conclusions of his theory. Of course, they, like all scientists, also noticed the oddities of the theoretical calculations of the patriarch of seismology, Grandfather Reid, but they did not attach any importance to them, and some of them were simply trying to correct the slippery situation that had arisen with the non-alignment of scientific facts and theory with small additions that, as it seemed to them, could bring "fresh blood" into an Elastic return." For example, in order to somehow patch up the theoretical gaps in Mr. Reid's favorite brainchild, a two-volume monograph by famous scientists K. Aki and P. Richards was published in the United States "Quantitative seismology"[17] on 880 pages, in which scientists made a detailed mathematical analysis of the elastic model of the earthquake source. In the comments to their work, scientists frankly and breathlessly report that they managed to calculate the forces in the earthquake source using only a minimal set of simple formulas: - "The models used are essentially mathematical, which are based on simple physical prerequisites and contain mainly equations of motion, Hooke's law and several other equations." Funny, isn't it, Gentlemen Aki and Richards decided to replace the fundamental laws of physics with the correct laws of mechanics, naively believing that this is equivalent? So, if Aki and Richards calculated tidal forces on the basis of correct mathematics, but without taking into account the physical laws of the propagation of the gravitational field, then they would have very funny values. Look: It's not enough to say that the force of gravity exists. It's obvious. But in order to predict its impact, it is necessary to take into account the physical laws and properties of the gravitational field. It is known that for the globe, the magnitude of the gravitational force of the Sun is almost 200 times greater than the gravitational force of the Moon, but the tidal forces generated by the Moon are twice as large as those generated by the Sun, comparable: 360,000 and 160,000 microns [18]. It would seem that this is blatant nonsense and based on simple mathematics, this simply cannot be, and the tidal forces of the Sun should be 200 times greater than the lunar ones! But if we know physics, then it will not be a big secret for us that this is due to the fact that tidal forces depend not so much on the magnitude of the gravitational field as on the degree of its inhomogeneity. And if we recall from the university physics course that elastic forces are a manifestation of the forces of the electromagnetic field and link the effect of this field with its

heterogeneity, then we will understand the Saint-Venant principle and then we can easily explain the insignificance or even the complete absence of elastic forces in a tectonic plate at even a slight distance from the place of deformation of the plate. This is clearly seen in our small, but indicative comparison of the values of deformations of rocks and their results: GPS devices show that the Hindustan plate is deformed by  $\sim 10$  microns daily, which for a plate with a volume of  $1.2 \times 10^9$  cubic kilometers, which is about the same as a drop of water in the Pacific Ocean (the thickness of a human hair is  $\sim 50$  micron). Now let's compare the figure of deformation of rocks equal to 10 microns and the figure of deformation of rocks equal to 360,000 microns and ask ourselves why the resulting deformations of rocks equal to 360,000 microns, which occur twice a day at lunar tides, do not cause destructive earthquakes, but the negligible elastic forces arising at 10 micron compression of the plate, according to Mr. Reid, cause catastrophic earthquakes? But that's exactly how, without taking into account the fundamental laws of physics and applying the useless Hooke's law in this case, which categorically cannot be applied when studying rock samples over  $1\text{m}^3$ , Messrs. Aki and Richards built mathematical models of elastic forces of earthquake foci for us. It is a pity that the 880-page monograph, on which scientists have spent thousands of hours of hard work, only brings confusion and chaos to the foundations of seismology. But this book is an icon of seismology. We can cite numerous examples and names of other respected scientists with a worldwide reputation, who, like Aki and Richards, are deeply mistaken about the energy source of seismic events, but we consider it unnecessary, because time will put everything in its place.

#### **4. Earthquake forecast**

The natural process of urbanization, accompanying universal progress, leads to an increase in the number of victims of aftershocks and threatens to increase many times in the future. People live, love, create families, build flourishing cities, but earthquakes come and cities with all the inhabitants turn into dust and tears. Scientists are doing everything possible to protect people from underground disasters, but time is passing, and there has been no progress in predicting underground cataclysms, giving people hope for a bright future. Scientists don't give up [19, 20, 21, 22, 23], and every year they develop more and more new methods for predicting earthquakes, but they do not work. A problem that seemed simple and not complicated within the boundaries of the theory of the occurrence of earthquakes as interpreted by Mr. Reid, in which two tectonic plates (blocks) rub against each other and "strike sparks" in harsh reality turned into an unsolvable riddle of nature. No matter how much seismologists struggle to solve it, no matter how much money the governments of many countries allocate, geophysicists have not invented anything worthy of serious attention, and every next destructive earthquake turns out to discouraged researchers like snow on the streets of New York in July. People tired of the promises of seismologists, suspicions crept in: - is there a solution to this puzzle in principle and are seismologists tempting humanity with vain expectations? In search of an answer to these questions, we have developed and presented in the article a hypothesis of the formation of earthquake energy based on Bohr's postulates, according to which humanity has a great chance not to predict, but to prevent (!) seismic phenomena in densely populated areas or around technically important objects, because prevention is much more important than prediction. We have devoted several works to the issue of the impossibility of predicting earthquakes, for example [24, 25, 26], because almost every month more and more new articles appear in the information space justifying the possibility of predicting such a seismic phenomenon. Only everything is in vain, because in modern seismology, all new methods of earthquake prediction are based on Mr. Reid's theory of Elastic recoil, in which, as we know, an earthquake is a mechanism for the realization of elastic deformation energy by geological bodies. As it was seen by scientists of previous years engaged in the prediction of seismic events, it is not difficult to calculate the elastic forces of rock deformations and make a forecast about the strength of the upcoming earthquake. All that needs to be done in order to determine the time and place of the

next impact of the underground element is to compare all the signs and harbingers of earthquakes with the database of aftershocks that have occurred in similar mining and geological conditions and give a reliable result: place, time, magnitude. Simple, isn't it? But not here, it was! For some reason (?) it was impossible to calculate, compare, analyze, and tame the process, it does not work, and apparently it will never work! And this is with colossal financial injections from the governments of advanced countries and the saturation of seismological centers with high-precision and intelligent equipment! So what's the matter? In the early 50s of the twentieth century, at the peak of interest in geophysics, scientists decided to follow the simplest, but promising scheme - to track the natural signs of upcoming earthquakes, the so-called earthquake precursors in seismically active areas and, based on their analysis, develop a universal and reliable earthquake prediction algorithm. The ultimate goal of this algorithm was to predict the behavior of the entire studied seismic zone during the predicted period of time. This way, according to seismologists, promised to bring quick results with insignificant budget expenditures. This seemingly promising direction of search was chosen in a number of countries regularly suffering from devastating earthquakes, including China, where the program was even released to the people, obliging every citizen to inform the authorities about the earthquake precursors they observed. Seismologists have proposed many schemes where even living "predictors" of earthquakes were taken into account in the form of animal reactions to processes occurring underground, which manifested itself in anxiety and panic before the movements of the earth's crust. They observed frogs, bees, birds, and animals, snakes that leave their homes, nesting sites, burrows, and dens before earthquakes. They monitored the behavior of fish and crayfish. They monitored the water level in wells and springs. Gases emanating from the faults of the earth's crust (hydrogen, methane, radon, etc.) were captured. They monitored the state of the ionosphere, changes in the electrical resistance of rocks, changes in electric and magnetic fields, and a number of 100% true (!) earthquake precursors. Geophysicists made the slightest touches to the observations of the precursors of aftershocks, changed their places and directions, but the victory day expected by seismologists fell to their share only once in history, when a major earthquake occurred in China on 02/14/1975, in the city of Haicheng. On this day, Chinese seismologists were able to successfully predict an earthquake by a sudden change in the water level in wells, from which water suddenly left all over the city in the morning. In this case, the happiness of seismologists ended, and the black streak of failures continued and is not interrupted until today. Seismologists all over the world began to realize that the matter is much more serious than they imagined, and they gradually moved from the tactics of "dashing rush and waving a saber" to the strategy of solving the task through fundamental research of seismic processes. The governments of a number of countries, frightened by the large number of earthquake victims and the huge destruction of the infrastructure of cities, began to allocate hundreds of millions of dollars annually from budgets to solve the problem of forecasting aftershocks. In a number of leading countries, as a result of huge financial support, colossal work was carried out to create and equip various research grounds, laboratories, research centers. Financial support for the work has borne fruit in the form of expensive research programs and the emergence of new forecasting methods based on them, which promised to give a plentiful harvest in the form of accurate forecasts of where, when, with what force the next earthquake will occur. For example, in the USA, Japan, Mexico, China, they decided to follow the path of high-cost geodetic monitoring of the surface of seismically hazardous areas through the creation of extensive geodetic tracking networks using software, and automatic tracking of monitoring dates via artificial Earth satellites. The Japanese, Americans, and Mexicans created computing complexes and began to monitor millimeter deviations from the relief of huge areas of seismically dangerous zones via satellites, but everything was in vain, and high-precision equipment missed a number of major earthquakes, showing its absolutely complete uselessness! Time passed, the number of scientific works of seismologists multiplied like mushrooms after a summer rain, and there were no real results of work in the form of reliable and accurate earthquake forecasts. Not a single accurate forecast for all the world's research centers and the

entire scientific community of thousands of the world! Discouraged seismologists began to realize that they did not understand anything about the mechanism of formation and realization of the energy of deformations of the Earth's crust, but what exactly they were doing wrong, seismologists did not understand. After comparing all the pros and cons, scientists, after a heated discussion on the pages of the journal Nature, disappointingly concluded that the problem of earthquake prediction has no solution and in 1999 issued a final verdict [27] which read:

**1. Earthquake predictions with sufficient accuracy to be able to plan evacuation programs are unrealistic;**

**2. Some forms of probabilistic prediction of the current seismic hazard, based on the physics of the process and observation materials, can be justified.**

Simply put, the world's leading seismologists have signed their professional unfitness in plain text. As a result of this decision, the governments of a number of countries have cut the allocated funds and curtailed funding for research in the field of earthquake forecasting. Although even earlier, in 1994, the US Congress decided to stop the targeted subsidization of earthquake prediction programs and transfer funding for seismic forecasting to finance earthquake-resistant construction tasks.

Let's try to figure out what is the matter and why scientists have failed in such an important issue for humanity? Let's ask ourselves a simple and naive question: will the house that the builder will build on a shaky foundation that does not meet the conditions of strength? The answer is obvious. The same, but no less naive question arises with earthquake prediction: will the theory of earthquakes and its prediction be put into practice if the theory itself is built on an alien physical foundation? The answer is also obvious. What do 99.9% of researchers of seismic processes proceed from in their work? They proceed from the basic position of Mr. Reid's theory about the long-term accumulation of elastic deformation energy by a tectonic plate (rock block) and the sudden release of this energy at some random moment. Isn't this the reason for the chronic failures of geophysicists, which lies in the fact that the theoretical basis of seismology is false? We have already shown above that the theory of the Reid contradicts the fundamental laws of science and the process of the passage of Time, which means that absolutely in all studies, calculations, methods based on the theory of the Reid, and these are thousands and thousands of scientific papers, a fundamental error initially crept in, which puts a fat cross on the work done. The price of this mistake is immeasurably huge - significant financial resources wasted, years of research and, most importantly, a huge number of human lives not saved from the underground element. And what kind of result can we expect if over the past century none of the huge army of seismologists has tried to explain by the example of a simple physical, chemical, or mathematical model the work of Mr. Reid's natural earthquake energy accumulator? Why does none of the famous seismologists want to show us the schematic diagram of this energy accumulator: where are the brands "plus" and "minus", "diodes", "transistors", "capacitors", "resistances" and other details of this energy and magic device? Not only do they not explain to us the detailed structure of this miracle energy storage device, but even in general terms the physical meaning and approximate principle of its magical work. There is no answer to another important question: why does this magic battery not allow the energy of deformations to dissipate in the surrounding space? Consequently, absolutely all theories based on Mr. Reid's erroneous conclusion are untenable and harmful. It was this gross mistake that led seismology into a dead end, from which scientists have not been able to find a way out for many decades, year after year winding theoretical circles around the hypothesis of Elastic recoil and teasing humanity with promises to turn a fabulous mirage into reality. To understand the illusory nature of such a position, it is enough to simply analyze the achievements of modern technologies, because technological progress creates conditions for the use of scientific equipment that opens the way for a comprehensive and full-scale study of processes that were previously hidden from

observation, including in the field of seismology. Novelties of modern equipment truly help scientists to “open their eyes wide” and easily refute dilapidated theories. It is no secret that since the 18th century, several generations of scientists have been studying seismic processes due to the low information base determined by the lack of international communication systems and high-speed transport, not only have they never seen or experienced tremors, they did not possess reliable and fresh geophysical information. They built all their arguments and hypotheses on the stories of very rare eyewitnesses and from the words of professors of geophysics, who, in turn, also never had personal experience of observing tremors or their seismic experience was limited to isolated cases. As a result of this state of affairs, seismology students and their professors drew knowledge and information from one “well” - the theory of Elastic Recoil, invented by Mr. Reid, who, in turn, had never personally seen any mountain impacts, earthquakes, or other seismic events. A hundred years have passed since Mr. Reid, and numerous video surveillance cameras have appeared in our lives, which recorded the moments of underground impacts and showed that seismic processes do not proceed at all as Mr. Reid imagined and modern seismologists imagine, and how the Elastic Recoil theory presents all this to us. Judging by the impartial video frames, no momentary and sharp rupture of rocks occurs, but the oscillatory process of the mountain massif occurs. It is obvious that with a sharp displacement of rocks in one direction, this cannot be, and this age-old error of seismologists in the form of the Elastic recoil theory did not allow the whole geophysics to develop and led science into an impenetrable jungle of false theory, according to which the elastic reaction force (recoil) can act only in the direction perpendicular to the fault surface. And since the earthquake source is the plane of rupture, the longitudinal wave must have only a positive sign, that is, move only from the earthquake source. However, looking at the video footage, we see that during earthquakes, both positive and negative (the vector is directed to the focus) movements of seismic waves are observed and their combination creates waves that are called cross waves. Such a situation occurs, for example, in the ocean, when two series of waves with the same lengths intersect at an angle in different directions, which creates an interference pattern and leads to the formation of unusually high waves, causing dangerous swell for people and ships on the surface of the water, Fig.2.



Fig.2. Square waves

In the case of earthquakes, a similar process occurs in the rocks of the earth's crust and there is a swell of the earth's surface, which leads to the destruction of buildings. But that's not all. From

numerous records of earthquakes, we clearly see that the rocks of the earth's crust often fluctuate not only in perpendicular directions, but also with vertical displacements and even along circular vectors [28]. It is unequivocal that from the point of view of the theory of Elastic recoil, this physically cannot be. But if we talk from the standpoint of a theory based on the postulates of Mr. N. Bohr and Mr. G. Joseph's theory of self-induction, this behavior of the earthquake source does not contradict any physical laws.

**5. Theoretical substantiation of the mechanism of seismic energy formation according to the postulates of Niels Bohr and the theory of self-induction by Henry Joseph**

Considering the dynamics of seismic events, we are primarily interested in the total mechanical energy of the body, consisting of kinetic, potential and internal energy. Based on the formula  $E_k = mv^2/2$ , the kinetic energy at the time of the earthquake at the initial time  $t = 0$  and the velocity of movement of the rock mass  $v = 0$ , will also be zero ( $E_k = 0$ ). Consequently, the source of earthquakes is the potential energy, which consists in the interaction of the body with the physical field. Therefore, the earthquake source must be located in a force field. There are two types of force fields – the gravitational field and the electromagnetic field. In view of the insignificance of gravitational interactions compared to electromagnetic interactions, we conclude that seismic energy is the energy of the electromagnetic field. The element that creates the physical field is the charge. In order for a charge to appear at a point in space, it is necessary to have charged particles, which can be all elementary particles. But since only an electron and a proton exist indefinitely in a free state, the energy sources of seismic phenomena are electrons and protons. It is known that the interaction of a force field with a body depends on three factors: the field strength, the coordinates of the body, and its ability to perceive the field. For an electromagnetic field, the ability of a body to interact is a charge. The field strength is an uneven distribution of the parameters of the force field over the volume of the body: charges, medium density, temperature, the magnitude of the mountain (stress) pressure, and other physical, chemical, and thermodynamic parameters that are layered on top of each other, causing the appearance of charges, elementary particles. In our opinion, it is the magnitude of stress pressure that acts as the main engine of any earthquake. Let us recall that lithostatic or geostatic pressure is the comprehensive (volumetric) pressure of the column of overlying rocks caused by the gravitational field of the Earth and numerically equal to the weight of the overlying masses of rocks, Fig.3.

The lithostatic pressure at depth  $z$  is determined by the formula:

$$P(z) = P_0 + g \int_0^z p(z) dz \quad (1)$$

Where: -  $p(z)$  is the density of the overlying rock at a depth of  $z$ ,

—  $g$  is the acceleration of gravity,

-  $P_0$  is part of the all—round total pressure acting in the rock framework.

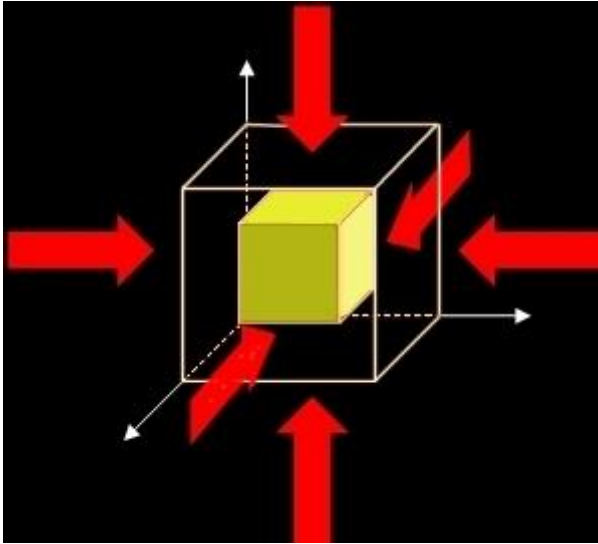


Fig.3 Lithostatic pressure

In addition to lithostatic pressure, there is unilateral stress pressure, which manifests itself in zones of geological disturbances, faults, and plate joints. It causes mechanical deformations of rocks, their crushing, increased permeability of fluids, the solubility of minerals, their recrystallization, mineralization, etc. and, most importantly, leads to the formation of charges! Consequently, a change in the stress pressure, physical, chemical, and thermodynamic parameters of the mountain massif serves as the starting point for the release of energy by elementary particles, Fig. 4 a, б, в.

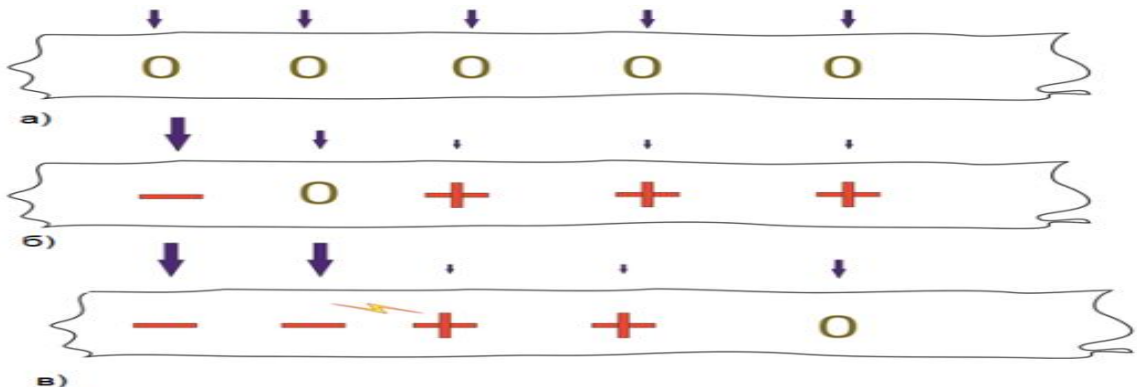


Fig.4. A change in the pressure parameter leads to the appearance of a charge and a force field.

Where:

In Fig.4a the magnitude of the charges is 0, because the rock pressure is evenly distributed over the area of the geological massif, which makes it seismically impotent.

In Fig.4б, the gradient of rock pressure in the geological body changes imperceptibly, which leads to the appearance of charges and an electromagnetic field of low intensity and an insignificant chance of an earthquake.

In Fig.4в, the rock pressure in the geological body changes, which leads to the formation of charges and a high-intensity electromagnetic field. In accordance with the second law of thermodynamics, forces will appear in the geological body that seeks to eliminate the disequilibrium of the medium by transferring charges, eliminating the potential difference between the system and its environment, dissipating energy into the surrounding space in accordance with the fundamental principle of the Minimum Energy of any system. If the rate of

energy release is not high, then it dissipates without rock movements. If at some point in time, the rate of energy release increases and a sufficiently strong electromagnetic field is induced, then subtle movements of the earth's crust occur in the form of rock heaving, etc. and if the processes occur with high rates of energy release and an increase in the intensity of the electromagnetic field, then full-fledged seismic events occur, leading to catastrophic consequences. Based on this, we can draw the following conclusion: the energy of a seismic process is the energy of an electromagnetic field, the magnitude of which depends on the intensity and speed of interaction of charges of this field, and the energy source of seismic events are elementary particles - electrons and an electromagnetic field.

The Nobel Prize winner Niels Bohr and the American physicist Henry Joseph did not assume that the postulate of the stationary state of atoms [29] and the theory of self-induction [30] would serve as the key to the mechanism of the formation of seismic energy. From the point of view of electrodynamics, any atom is unstable, since when moving in orbits, electrons lose energy and, eventually, must fall on the nucleus with the collapse of the Universe. But this is not happening. To resolve this paradox, Niels Bohr formulated the postulate:

*“Atomic systems exist only in stationary states in which, despite the movements of charged particles occurring in them, they do not emit or absorb energy. In these states, atomic systems have energies forming a discrete series:  $E_1, E_2, \dots, E_n$ . Any change in energy as a result of absorption or emission of electromagnetic radiation can occur only with a complete transition (jump) from one stationary state to another stationary state.”*

Let's consider the rock mass (the future earthquake source) from the point of view of the Niels Bohr theory. At some point in the formation of the planet's lithosphere, the atoms are given energy from the force of volumetric pressure. In view of the uneven effect of pressure, charges appear in the mountain massif, and an electromagnetic field will be induced, the energy of which will be transferred to electrons, which, according to N. Bohr's postulate, are obliged to move to an external orbit with the absorption of a quantum of energy. Fig.5a. Subsequently, at some point in the existence of the rock mass, three possible variants of the behavior of atoms are possible, the probability of which will depend on the magnitude of the deformation forces and some physical and chemical parameters on which the magnitude of the critical potential depends [31].

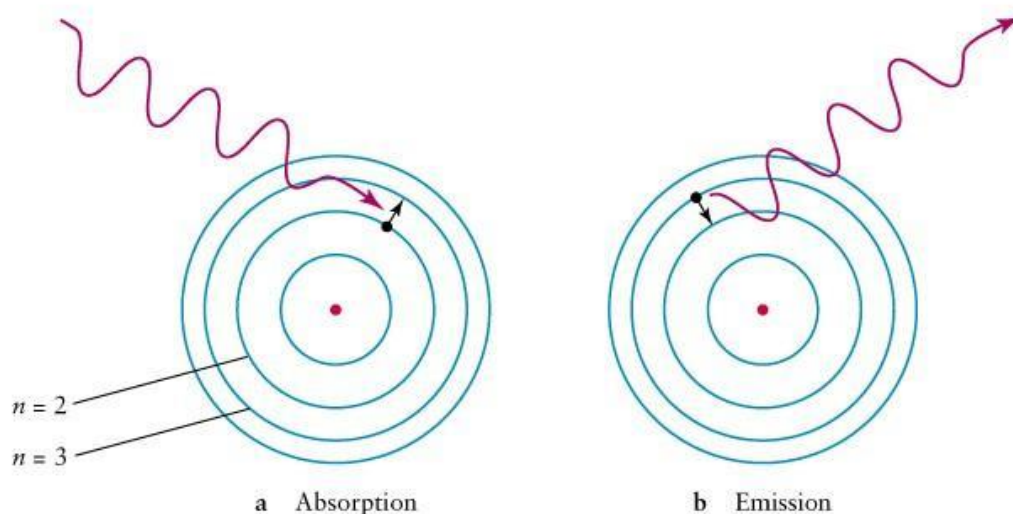


Fig.5(a,b). The graphical meaning of Bohr's postulates.

Option 1. If the action of the deformation forces is elastic, then the critical potential will be reached. The electron will try to move to another stationary orbit with the absorption of a



quantum of energy, but in accordance with the Niels Bohr postulate it will not be able to perform a jump. But an electron cannot be between stationary orbits even after  $\sim 10^{-8}$  seconds. it will return to its previous orbit without releasing energy. The rock mass can be in this state forever.

Option 2. At some value of the deformation forces, the energy may be enough to exceed the critical potential and the electrons will abruptly change the stationary orbit, emitting a quantum of energy at the same time. In this case, the deformation of the mountain massif with possible movements of rocks will occur. At the same time, the mountain range may return to a neutral state (option 1) or, if the process of energy release continues and causes further displacement of rocks, this will lead to a further change in mountain pressure and a significant increase in the intensity of the electromagnetic field and option 3.

Option 3. In case of significant movements of geological bodies, changes in their physical or chemical state, thermal factors, sudden release of rock pressure, etc., the rock block will be reset. Electrons, in accordance with the Niels Bohr postulate, will jump from orbit to orbit, and at the same time they will be allocated according to the quantum of energy, Fig.4b. Moreover, an electron can jump through several orbits at once, which will significantly increase the energy of the induced electromagnetic field and its intensity, which can lead to fluctuations in the rocks of the future earthquake source. Based on the mechanism described above, it becomes obvious that the process of earthquake energy formation directly depends on the intensity of the electromagnetic field of the hearth rocks. But, there is another factor that will determine the probability of an earthquake and its power. This factor is called the inductance of the planet Earth, and its essence is described in the theory of self-induction by G. Joseph. Since our planet is a generator that creates its own magnetic field, the bowels of the Earth play the role of windings of a huge induction coil, and the magnetic induction created by it will determine the strength of the Earth's magnetic field on moving charged rock particles and the electromagnetic field of the earthquake source. Obviously, the more potential energy goes into the kinetic energy of a geological body, the more powerful the earthquake will be, and since, figuratively speaking, inductance is a kind of kinetic energy of a force field, the higher the inductance, the stronger the earthquake will be. A comparison of the inductance energy formula and the mechanical kinetic energy formula of the body clearly shows the identical physical meaning of inductance and kinetic energy. The inductance B determines the energy of the magnetic field EI generated by the current I:

$$E_I = 1/2 \cdot B \cdot I^2 \quad (2)$$

Similarly, the mechanical kinetic energy of a body is determined by the mass of the body m and its velocity V:

$$E_K = 1/2 \cdot m \cdot V^2 \quad (3)$$

From this, it can be concluded that the inductance during the movement of the charge creates energy in kinetic form. Moving along the coil windings, the charge does not accumulate but strengthens the magnetic field. Therefore, inductance is the ability of an inductor to extract energy from an electric current source and store it in the form of a magnetic field. Thus, if the current in the inductor increases, then the magnetic field expands within its boundaries, and if the current decreases, then the field will shrink until it disappears.

## **6. The mechanism of earthquake formation, underground rumble, tremors, and shaking in the center of aftershocks**

As soon as “cyclones and anticyclones” of areas of reduced or increased mountain pressure (impacts, explosions) appear in some place of the “underground kingdom” for some reason, then instead of lithostatic pressure, an area of stress pressure is formed and as a result of this process, rocks are moved (inflated) into the resulting zone of reduced pressure. It is obvious that in this

zone of reduced pressure, subzones with modulo different pressure values will be formed, which is why the entire volume of the rocks being moved cannot have a one-way motion vector. There will be several of them, depending on the number of stress pressure subzones. These vectors will be yawing vectors that change their direction every second. The impact of forces varying in modules and vectors will create an oscillationally pulsating process, which we see in the frames of video recordings. At the moment of the beginning of the movement of rocks, the electrons in the above-described variant 3 will jump to another orbit, and the process of formation of the electromagnetic field of the earthquake center will begin, which will immediately interact with the magnetic field created by the generator of the planet. As a result of the interaction of two magnetic fields, the magnetization [32] of the rocks of the future earthquake source will change dramatically, which will cause another phenomenon called magnetostriction [33], which will cause an aftershock (tremors) and all other seismic effects. The essence of the phenomenon of magnetostriction is that when the magnetization of a physical body changes, its volume and linear dimensions will change with a certain frequency (pulsate), while emitting the characteristic sound of a powerful transformer, and the more the magnetization changes, the stronger the tremors and other manifestations of seismic effects will be. An analogy of such a process is an inductor with a movable core that will move back and forth (pulsate) when voltage is applied to the winding. It should be noted that the role of the core can be successfully performed by magma located in the earthquake zone. It is the pulsation of the rocks of the earthquake hearth and magma that can explain the shocks, trembling, staggering, and shaking of the earthquake hearth for several tens of seconds and minutes and the rumble of the earthquake, which is nothing more than a low-frequency acoustic wave from the pulsation of the rocks of the earthquake hearth, which can spread in the form of infrasound picked up by various animals. These are the pictures we see when viewing video footage of earthquakes recorded by cameras around the world. Since the inductance depends only on the geometric dimensions of the contour (earthquake focus) and the magnetic properties of magma, rocks, and minerals composing the earthquake focus, they will directly proportionally affect the magnitude of the earthquake. It should be added to this that magnetic storms in the Sun, with certain coincidences of random factors, can affect the overall inductance of the earthquake source in the direction of increasing the magnetization of the earthquake source and in some cases serve as an earthquake trigger. Applying our hypothesis to any type of earthquake, we are convinced of its universality, which is a good sign of the correctness of the chosen path in explaining the mechanism of earthquakes. If our hypothesis is correct, then, unfortunately, we have to make a very important and sad conclusion for humanity – earthquake prediction is basically impossible!!! In this case, allocating budget money for earthquake prediction programs is the same as allocating money (hundreds of millions of dollars annually in developed countries) for the construction of a perpetual motion machine. We understand that by making this conclusion, we will cause negative emotions of the “eaters” of budget money allocated to solve the problem of earthquake forecasting, but physical laws and life experience stubbornly confirm our conclusion. And scientists who disagree with us have a good opportunity to prove the opposite to us by making a forecast of at least one powerful earthquake for this or next year. But we know that no one will undertake to make such a forecast, because, despite all the modern and expensive methods and techniques of forecasting: space geodesy, various ultramodern sensors and an electromagnetic measurement and sensing device, deep-laying stations, GPS, etc. – this is fundamentally impossible. The money allocated for earthquake forecasting will always be thrown to the wind. The California earthquake of 1980, which occurred in an area with a super modern monitoring network existing there, equipped with numerous and smart sensors, telemetry and full computerization of this system, clearly demonstrated this to us. Well, a very obvious, but very important conclusion for scientists, arising from the Bohr postulate, is that a rock mass in which its atomic system is in a stationary state cannot emit seismic waves. So, in order to prevent earthquakes, we need to keep the electrons of the rock mass in a stationary state. No matter how fantastic this idea may seem, but the experience of mining engineers in dealing with Rock Burst and Sudden Emissions in mines

clearly confirms: - it is quite possible not to predict, but to prevent tremors! Knowing the source of earthquake energy and the processes occurring during this event, humanity has a real chance to curb the underground element through a system of preventive measures that exclude the chain development of events in earthquake-prone and densely populated areas, locations of super hazardous industries, nuclear power plants, by creating safety belts around them. We would like to strongly add that the impact on the foci of future earthquakes should occur through a combination of man-made impacts with natural deformation forces in rock massifs. Our task is to find combinations that can either stimulate the process of minor foreshocks in the places we need, or find variants of processes that lead to a complete blockage of the possible process of movement of the rock massif and changes in rock pressure in it. But not for the purpose of so-called discharge or stress relief, as modern seismology claims, but for the purpose of “settling and tamping” the blocks of the rock massif, excluding their slippage relative to each other, because, as we found out, an earthquake is caused not by the force of deformation of rocks, but by their sudden movement. By “shaking and ramming” rock blocks and slabs, we will eliminate the random and arbitrary transition of the array into a non-equilibrium state, which can lead the array to its catastrophic discharge of electron energy during the transition from one stationary orbit to another. For us, the main thing is to choose such a combination of joint impact on the rocks of the array, to which the array will begin to “respond with pleasure” with the frequency and energy level we need, until it “gets rammed” and calms down for many years. By the way, before the ban on nuclear explosions, there was a sharp decrease in the number and strength of underground vibrations around the world. Seismologists explained this phenomenon by the fact that a seismic wave propagating over long distances relieves stresses of elastic deformations in rocks, which, as we found out, does not correspond to reality. In fact, a seismic wave slightly shakes and compresses the rocks of the earth's crust, depriving them of the possibility of sudden movement. This was exactly what needed to be proved!

## **7. Conclusion**

Based on the above material, we can conclude that the theoretical foundations of modern seismology grossly violate at least four fundamental principles of science: the minimum energy of any system, Saint-Venant, Le Chatelier—Brown and the law of Elasticity of physical bodies. In addition, when considering the issue of the formation of the energy of seismic events, the influence of the time factor on the processes occurring in the earthquake focus is not taken into account. As a result of this approach, the results of modern research achieved by seismology are at the level of their development at the beginning of the 20th century and do not even closely correspond to observations and experience of seismic events that have occurred.

The mechanism of the formation of earthquake energy is explained by the postulates of Niels Bohr: - as soon as deformation forces appear in the massif that can change the established mountain pressure, the electrons of the rocks of the mountain massif “jump off from their native” stationary orbits with simultaneous emission or absorption of a quantum of energy. No time is required for the accumulation of earthquake energy measured over centuries, as the dogma of the Raid teaches us, since the mountain range implements the energy of current, momentary deformations. The time of the earthquake's onset will be the moment of the electron's transition to another stationary level, and the earthquake's power will depend on the magnitude of the critical potential and the discrete series, because an electron can jump through several stationary orbits at once. It is obvious that the prediction of earthquakes is impossible in principle. No matter how sad it may be, but it is necessary to accept it, to comprehend it and to make every effort to find solutions in which it will be possible to minimize the catastrophic consequences of earthquakes to an acceptable level of safety.

A rock mass in which its atomic system is in a stationary state cannot emit seismic waves. This means that in order to prevent earthquakes, it is necessary to keep the electrons of the rock mass

in a stationary state by an acceptable process, which is quite possible given the experience of mining engineers in preventing sudden emissions and rock burst.

Financial losses in catastrophic earthquakes are so great that several percent of these amounts would more than cover the costs of training seismology students with competent professors with multidisciplinary knowledge, for the equipment of modern laboratories, for the arrangement of field camps and research centers around the world. Moreover, this cannot be postponed for later, because no one knows when the next catastrophe will happen and how many lives it will take. It should also be noted that editors of scientific journals related to Earth sciences in one way or another should play an important role in studying the problems of seismology. They should stop the practice of entrusting the review of incoming papers by scientists who do not have sufficient qualifications, because otherwise we will never break out of the circle outlined by Mr. Reid and his theory of Elastic Returns. And stop hiding your head in the sand, we either admit the mistakes made in studying the problems of seismology, or we continue to go with the flow into a dead end of geophysical problems, like that mythical Greek Sisyphus, Fig. 7, who, according to mythology, cannot put a stone on the top of the mountain. Sisyphus patiently drags the stone to the top over and over again, and each time it rolls back down.



Fig. 7 Ancient Greek seismologist Sisyphus

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