

## Commentaries on the book “The Field”, author L. McTaggart (Romanian version 2009)

M. Apostol

Department of Theoretical Physics, Institute of Atomic Physics,

Magurele-Bucharest MG-6, POBox MG-35, Romania

email: apoma@theory.nipne.ro

*To Stelian and Camelia for their faith in Science and Scientific Research*

Since a long time ago, a lot of stories have wandered around the world about strange phenomena such as telepathy, telekinesis, homeopathy, ghosts and phantoms, energy field, remote distance healing, etc, etc. On one hand, they have a whiff of science, on the other hand, they do not seem quite credible. I do not get scared (easily) of ghosts, I would be able to walk alone in a graveyard at night. Besides, Physics has shown me enough miracles and wonders to no longer have a “sensitive nature”. It is regrettable, however, that assertions and commentaries on the foregoing phenomena are left exclusively to some improvised researchers instead of being scientifically evaluated by institutions pretending to be specialized in scientific research. The above mentioned book presents a series of such phenomena in a slightly sensational journalistic style with a tinge of science which was caught by the author during her interviews with some researchers. In the following I will comment that part which seems more scientific.

A first aspect discussed in the book refers to zero-point energy (the fluctuations of electromagnetic field). First of all, the English physics term “zero-point energy” is rendered incorrectly into Romanian as “the energy of zero point” - I do not know the exact formulation used by the author in the book. We definitely do not say “zero field”, not even “zero-point field” (the Romanian translation is bad, the author herself is not very acquainted with this subject, the translation increases the confusion, so that it is very hard to speak a common language with these people). The general idea is that zero-point energy would be an infinite resource of accessible energy. It is not unlikely that this energy may be an important reality we can rely on. On the other hand, there were and are many who did not and do not like Quantum Mechanics. They do all they can to avoid it, to replace it with Classical Physics. In this context it is brought into discussion a publication of T. Boyer (Phys. Rev. **182** 1374 (1969), entitled: “Derivation...” and translated “Deviation...”, which is something else altogether). (Such attempts are described in detail by P. W. Milloni, Phys. Repts. **25** 1 (1976)). This author sets itself to derive Planck distribution for the black body without considering the quantum hypothesis of Planck (Einstein)  $\varepsilon = \hbar\omega$  (both matters are of great importance in Physics). Therefore, he resorts to the fluctuations of electromagnetic field and some obscure analysis undertaken by Einstein and Hopf on the energy transfer in statistical equilibrium.<sup>1</sup> Had he succeeded, the author would have a notable success: on one hand, zero-point energy would prove to be something that is really important (it would

---

<sup>1</sup>The attempt is part of a larger “ideology” named Stochastic Electrodynamics, setting itself to explain everything and anything through fluctuations and small flickers of some universal and sub-elementary particles (a movement called back then Zitterbewegung). This theory made even a minor career and aroused many, and relatively volatile, imaginations. For instance, according to it, the laws of Physics would be a “rule”, a “regulation” and these little

explain the black body radiation), on the other hand, Quantum Mechanics would be something we can do without. Unfortunately, this author fails, of course, in his approach. Eventually, he obtains Planck's distribution law and, with some concession, the law  $\varepsilon = \hbar\omega$ , as well. The derivation made by the author is valid not only for zero-point fluctuations of the electromagnetic field but also for any other value of it, which is quite disconcerting.

The catch is the lack of logic of these sorts of authors. Planck distribution is derived from Quantum Mechanics. As well as the electromagnetic fluctuations (as an aside, after using it, Quantum Mechanics is subsequently abandoned by such authors). As a result, we have two deductions of Planck distribution, one from Quantum Mechanics and the other from Classical Physics plus the electromagnetic fluctuations. One party must conciliate the other one. Authors of this caliber have a problem they disregard in their enthusiasm. However, Boyer's publication is very interesting due to the technical matters put into play. Unfortunately, it only succeeds to show us that, paradoxically, Quantum Mechanics is compatible with Classical Physics and consistent at that (as is also the latter). Such authors are very clever but to what good? As it always happens, the tragedy of those much too clever resides in the fact that they get not only what they want but also many other unwanted things, which, actually, do not exist. In order to do Physics, cleverness is, perhaps, necessary, some say it would be imagination, culture, learning, specific training, discipline, mathematics (the language in which Newton, allegedly, was reading the book of Nature and, according to some, the only foreign language Galilei was acquainted with), others assert this and that. Perhaps all these together are necessary. Nevertheless, they are not sufficient. Physics is something else altogether. If I were not modest (as I'm not) I would say, with all false modesty, that Physics is what I do when God put His hand on my head (I am just joking). Of course, I am well aware that this helps too little.

But I really fail to see the motivation of such an "ideology": Quantum Mechanics is wonderful and useful, energy, zero-point fluctuations are important matters (although not as important as these ideologists force us to believe), in general life is OK and there are many other extremely interesting real problems which are still outstanding. But none of them concern these authors' minds which are full of many vain efforts and idle runs, instead. Zero-point energy is associated with vacuum polarization and has notable effects: for instance, the electric force called Casimir force (or van der Waals-London), the small change of energy levels (Lamb shift), etc. We cannot take energy out of the vacuum and leave it empty in the literal sense of the word. Its energy is infinite and the law of conservation of energy would be meaningless then. It is true that two parallel metallic plates are drawn towards each other with the Casimir force of the quantum vacuum and do splash when they come into contact; thus, we would obtain energy from the vacuum from many such splashes (a device that such authors were not late to patent) but where do we get separate metallic plates? Is it not too costly to produce them separately? Hence, we would obtain an infinite energy by capturing the gravitational energy of a ball that keeps rolling down from the peak of a mountain, while we keep rolling it back again and again, like the mythological Sisiphus. Akin to Sisiphus, those people' work is nothing but an exercise in futility.

People believe that the electron is spinning around the hydrogen nucleus and fail to understand why it stubbornly persists in doing this, instead of emitting its whole energy and collapse on the nucleus. They do not want to admit that the electron is not orbiting around the nucleus but has a stable delocalized, movement. Therefore, H. Puthoff tried to demonstrate, in *Phys. Rev. D***35** 3266 (1987), that, while circularly orbiting the nucleus, the electron continuously absorbs

---

flickers would embody the "free will". We can easily realize how many heated minds would have twisted this ebullition if it had delivered us the promise of a Moral based on Physics. Without being touched by the complete failure of this complete approach, I confess that I prefer a more narrow scope but clear matter to an absolute but blurry one. *Pauca sed bona.*

zero-point energy and continuously gives it off and this self-regenerating cycle that goes on and on, accounts for the eternal motion of the electron around the nucleus. I only can say: yes, indeed! With a few objections: the author walks on the narrow path of dipole approximation but what about going beyond it? Does he know what the result would be? Because the Lorentz force that he so definitively relies on is wicked, and when push comes to shove it can leave you in the lurch. But, indeed, although there is no true corroborating evidence, in its motion around the nucleus, the electron continuously absorbs and gives off zero-point energy from and towards the vacuum polarization. The calculations in the aforementioned publication are well-known and often invoked for what is called the absolute natural broadening of spectral lines. Both the absorption and the emitting of zero-point energy are equivalent in this case with quantum delocalization. I fail to see anything miraculous in this, except for the “ideology”: what do we do with such calculations in the case of excited states of atoms? What do we do with quantum transitions, with a net electromagnetic field above zero-point fluctuations? Because we just kinda make ourselves zero!

A ghost is haunting the Europe of Physics since long time ago: the ghost of the failure to grasp the Electromagnetism. Electromagnetism is a subtle science (like all genuine Physics) that gives a lot of trouble to many. In his famous Lectures, Feynman decidedly asserted that, when you lean more heavily on it, the Electromagnetism starts to crack, it has an appalling weakness, a searing pain, an itch that burns it and eats away at it on the inside. More reserved and all the more disconcerting, the great Landau proved in black and white that, when you lean on it, Electromagnetism either does not exist or it is impossible. Those who grabbed the other day the Nobel prize, by putting forward the same type of arguments but slightly topsy-turvy, proved that quarks, namely our world, exist but they are not. Where is the solution? Are these people right? Is it really and truly so? But I will not tell you in order to make you to study Physics and find the answers yourselves.

Prompted by an intelligent obsession, the same author, Puthoff, turned the problem upside down in a subsequent publication: *Phys. Rev.* **A40** 4857 (1989). If zero-point energy accounts for the erratic motion of the electron, then this one, in its turn, in an obliging and gentleman-like manner, generates and sustains zero-point fluctuations. Indeed, the quantum motion is self-consistent. So, what is so scientifically jaw-dropping in this book, as it attempts to suggest? And what is new and wonderful in it, what opens up uncanny and undreamed-of horizons? What does it contribute to the rescue of humankind? Of course, apart from the well known quantum marvels. The dogmatic, fanatic and doctrinaire imperialism is universal: in another publication (*Phys. Rev.* **A39** 2333 (1989)), the same author, using the same calculations, proves that also gravity stems from electromagnetic fluctuations. No one and nothing escapes them. It only remains for the matter that has not a dipolar oscillation, to dipolarly oscillate. The electron, for instance! ‘Cause it is gravitational too.

In the first chapter of the book, the author pushes us to embrace the ideas that electromagnetic zero-point fluctuations are miraculous, that they can provide us as much energy as we want, that they form an universal ocean in which we are all interconnected, all with each other and one with another.

In support of this enthusiasm – that I would call juvenily naive but that is, however, propagandistic and sensational – the author brings the testimonies of some scientific authors who are astounded and anaesthetized by their own minor successes. Furthermore, none of the author’s wishes can be substantiated, there is no novel scientific finding in the nice and cute publications of those small authors, except for much pro domo and a lot of ballyhoo, even if the latter is not made, perhaps, deliberately. We do forgive them, for they do not know what they are doing nor what they are saying.

The book continues by presenting the researches of Fritz-Albert Popp who would have discovered that any living organism, as long as it is healthy, emits a very, very weak but coherent ultraviolet light. Biophotons. If the organism gets ill, this light turns off. The wavelength of such a light would be of  $380nm$ , namely  $3800\text{\AA}$ . The more complex the organism the weaker the light. (Are there more diseases for a man than for a potato, for example? Probably). Coherence is the organization of undulatory and oscillatory processes so that they have the same phase. Such an organization is often more favourable from energy standpoint and it frequently occurs in lasers, for instance.<sup>2</sup> In support of such “theories” references to another one are sometimes made, namely H. Frohlich’s theory (Phys. Lett. **A51** 21 (1975), for instance) on some kind of coherence, phase transition, arrangement etc. in living tissues - the author himself does not know exactly what it is. I remember that this “theory” was in vogue in the ‘80s (as it was everything pertaining to biophysics; it still is today, with a focus slightly shifted towards medicine; the stuffed big shots of the Planet, demand science to make them healthy, immortal and young, to perform miracles and repair their bodily ravages caused by gluttony and lust, otherwise science is useless; hence, the boom in genetic research, stem-cells, pharmaceuticals, etc, etc). Back then, I also let myself get carried away by the “biophysical” excitement, fever. It was a waste of time. Frohlich (whom I hold in great esteem for discovering charge-density waves in quasi-dimensional materials, the so-called Peierls-Frohlich transition) does not know what he is talking about in these publications. He has vague, numerous and obscure intuitions but with no consistency in their mathematical formulation. Even today there are many biophysicists who keep banging on endlessly about Frohlich coherence. These people are driven only by the desire – a hot one, even ardent I may say, but nevertheless powerless - to make “great discoveries to the benefit of the ailing humanity” (as our writer Caragiale put it) and to take one, two or as many Nobel prizes as they can get their hands on. However, this chapter too, mentions in all innocence (I quote in the bad Romanian translation of the book): “Si tot ce avea nevoie era ca alti cercetatori, cu dovezi experimentale, sa demonstreze cum se putea sa fie asa” (an approximate translation of this paragraph would be: “All that she needed was for other researchers to show, by experimental evidence, how this was possible to be so). Quite so! We come with the ideas and others do all the work (one says that once this would have been the policy of the Romanian delegation at a CMEA meeting - the Council for Mutual Economic Assistance – with the “ ideas” slightly changed into something else).

Further on, the book presents the career of a relatively famous and controversial researcher: J. Benveniste. According to him, chemical substances exert a certain action upon the living organisms, action that manifests itself even in the absence of the substances in question due to some electromagnetic print (of very low frequencies, in the range of  $20Hz - 20kHz$ ). And thus he invented the extreme homeopathy when, in the absence of the substance that was used, the effect is provided, and even increased, by the electromagnetic ghost of that substance, due to the so called “water memory”. Of course, for water to have memory it should have contained the respective substance, in the first place. Benveniste was totally discredited by a team of three investigators comprised of a mad editor, a charlatan of some repute and a frustrated magician who stirred up the public opinion.

It is true, at present the science is a dogma (I didn’t expect it!), if you are not “scientific” no one pays attention to you, moreover, the fierce bully boys may even beat you! If people would just know of how much provisionality, how much hypothesis, how much indefinitiveness, how much improvisation and how much genuine modesty is made up this sound fabric of science! I think water memory as well as the previously mentioned biophotons are worthy to be seriously - but dispassionately – considered. Unfortunately, these matters are often discredited by their very

---

<sup>2</sup>In this context, perhaps you will find useful the article in Phys. Lett. **A374** 4848 (2010) by M.Apostol and M.Ganciu.

own authors, through their bizarre and fancy “theories” they put forward by word of mouth or in writing. I remember that in 1989, two guys, Fleischmann and Pons, allegedly discovered, according to them, the “cold” fusion. I studied the problem myself and found it interesting (palladium exposed to hydrogen displays a strange behaviour and this fact was observed by chemists since 1930! or even earlier if I am not wrong). Meanwhile these two had already trumpeted a series of scientific enormities (“we need another Quantum Mechanics”, etc, etc), so that they were pushed into a shadowy background, away from the public eye which is sensitive to scientific blasphemies (I, for one, am not upset if we need another Quantum Mechanics; but it seems that these poor incompetents are really annoyed! The worse thing in the world is the quasi-intellectual, half-intellectual, that pathetic specimen who, during his entire life, has only read a few (and bad) books, and who, on top of that, is stupid, evil and bumptious. Nowadays, the researches on cold fusion are still carried out in a relatively discredited community, in a rather secretive manner but it doesn’t do to display your trust in this subject at the comrades’ fashionable meetings called today conferences, seminars, workshops and other scientific get-together. It is simply mauvais goût. Numpties too can sometimes have refined tastes.

“Zero-point energy” is invoked in the case of both biophotons and water memory. Under its action molecules would resonantly communicate among them, producing “coherence domains” which are active in the living matter at low frequencies. It is a whole story with this “coherence domains”, an idea originating with G. Preparata, in 1985 (under Weber’s influence who pointed out the coherence in neutron scattering, etc., etc.), and further developed by Del Giudice’s disciple and many others. I did not escape this challenge either. Coherent scattering does exist and I have encouraged my colleagues in Magurele who are experimentalists to study this problem; following their investigations they could see the neutrino scattering in a sapphire crystal, as Weber also did in 1980 (though no one gave him credit; besides, a sapphire detector is much cheaper and thus outside the views of the “establishment” in the scientific research – low cost, low personal benefit; moreover, it is not ours is theirs, and now is also of “the gypsies in Bucharest”). Subsequently, under the influence of my “biophysical” environment in Magurele, I developed the coherence domains. It was I who did this not those who previously boasted with them, but it doesn’t matter much. These coherence domains are quite a strange thing in our Physics, I admit. But I fail to see what will they lead to. But then again, who knows?

Coherence is also invoked in “hologramatic” thinking when the brain can see and understand in the absence of the cerebral matter, in telepathy, extrasensory perception, clairvoyance, precognition (premonition), prayer, healing by touch, collective mentalities (gregarious instinct), etc, etc. Witches, magicians, popular spells, spies, etc, loose all their romance (and their turnover). Two researchers, Dunne and Jahn, also made waves in such matters (I remember that they were severely criticized in a respectable scientific journal, in 1990, by a Nobel prize winner who accused them of vitiating the statistics of Father Bayes; what a fine piece of critic and what a fine piece of man, Father Bayes, but of no relevance to the problem). Tangentially connected to the coherence are also the non-localization of a wave-function and the lack of causality, both of them well-known in Physics. People believe that Physics is mysterious and therefore they link the real experimental mysteries to the “mysteries” of Physics. This challenging, speculative and clever enterprise is capable to twist the mind of the ordinary man akin to the wicked fairies dancing at crossroads in the middle of night. The truth is much more banal: Physics is full of wonders not mysteries; mysteries, worthy to be studied, belong to Nature, instead. But we love to indulge ourselves in the idleness to study the latter and in the delight to savour the former. Besides, if something we really-really like is not also spiced up with a little mystery, the attraction shrivels. Where would the romance, the magic be? Let’s not fall, God forbid, in triviality and drag our very greatest pleasure into it! It would be too dull. Therefore, we should dribble a little bit mystery over this

“something” so dear to our hearts, we should obscure it, we should wrap it in the mist of the unknown. Of course, this case is related to psychoanalysis not to scientific research or to a sound mind.

The end is the same as the beginning, the book returns to where it all started, at zero-point energy. This is why I liked this book. I am indebted to the two friends of mine who gave it to me and to whom, as a token of gratitude, I dedicated these commentaries.

(Translated from the Romanian apr172 by Iulia Negoitza).